FEBRUARY 16, 1935

Railway Age

Founded In 1856

Unitcast Construction With Conventional Carbon Steel Sheets, Standard A.R.A. Trucks and Z-26 Center Sill. Revenue Ratio With 52 Lb. Coal—76.4%.

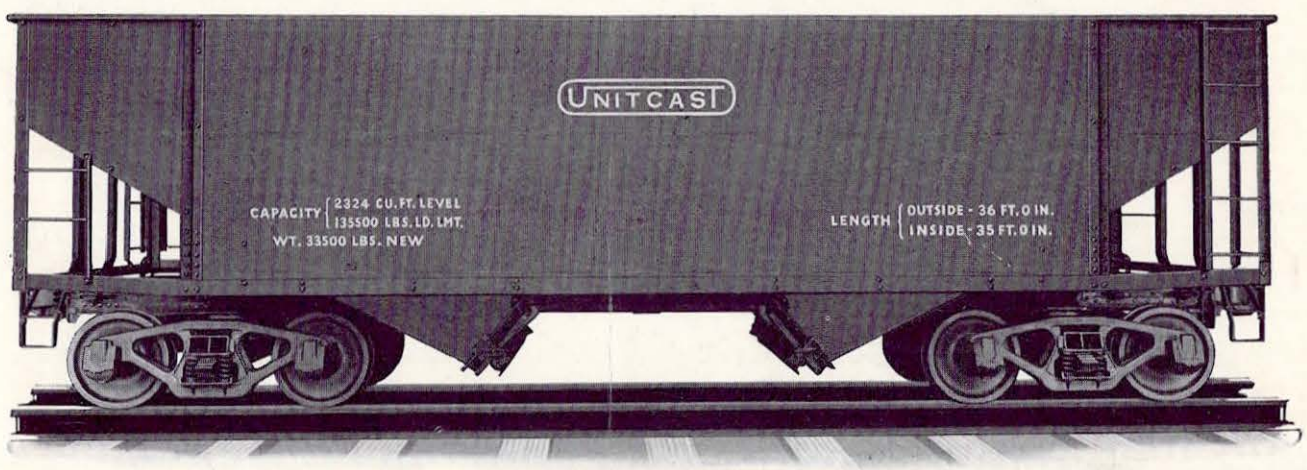
THERE IS A PLACE IN EVERY CAR

WHERE UNITCAST DESIGN

WILL

SAVE WEIGHT

McCARTNEY LIBRARY
GENEVA COLLEGE



Unitcast Construction With Alloy Sheets, Welded Design and Standard A.R.A. Trucks. Revenue Ratio With 52 Lb. Coal—80.18%.

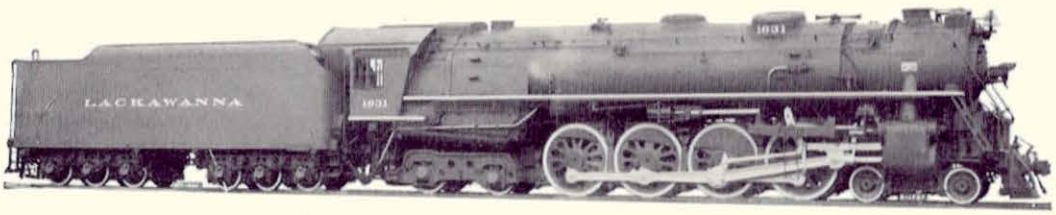
THE UNITCAST CO. **TOLEDO**

A STRONG FOUNDATION

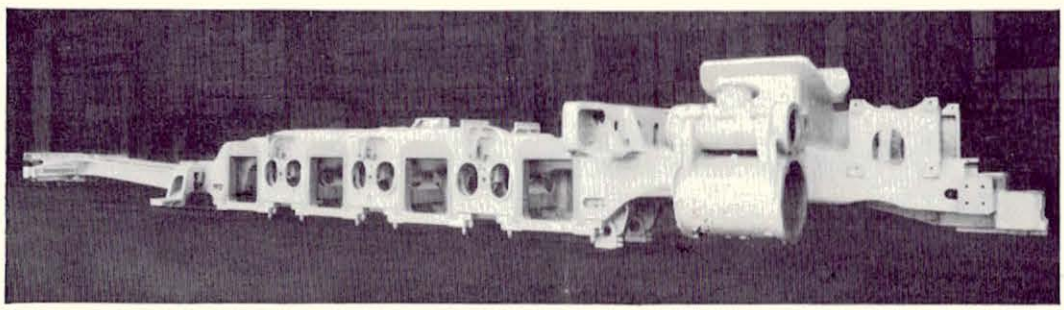
Locomotives, for present day high speeds and continuous operation, require the simplest and strongest construction.

Build your locomotives on

COMMONWEALTH BEDS



One of 20 Pocono Type Locomotives for Fast Freight or Heavy Passenger Service
Built by American Locomotive Company



Commonwealth One-piece Cast Steel Bed for D. L. & W. Locomotives

More Dependable Service — Lower Operating Costs

Other Commonwealth Products on These New Locomotives

Waterbottom Tender Frames
16,000 Gallons—20 tons coal

Six-wheel Tender Trucks
Swing-motion, Equalized Type

Engine Trucks

Delta Trailer Trucks

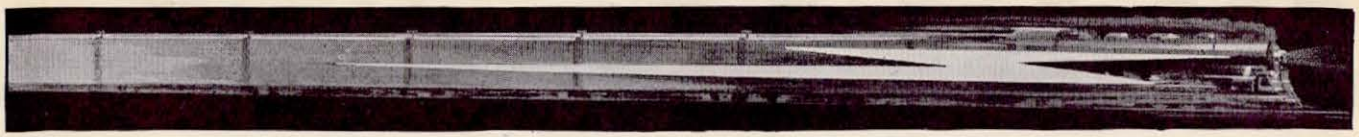
Boxpok Driving Wheel Centers

GENERAL STEEL CASTINGS CORPORATION

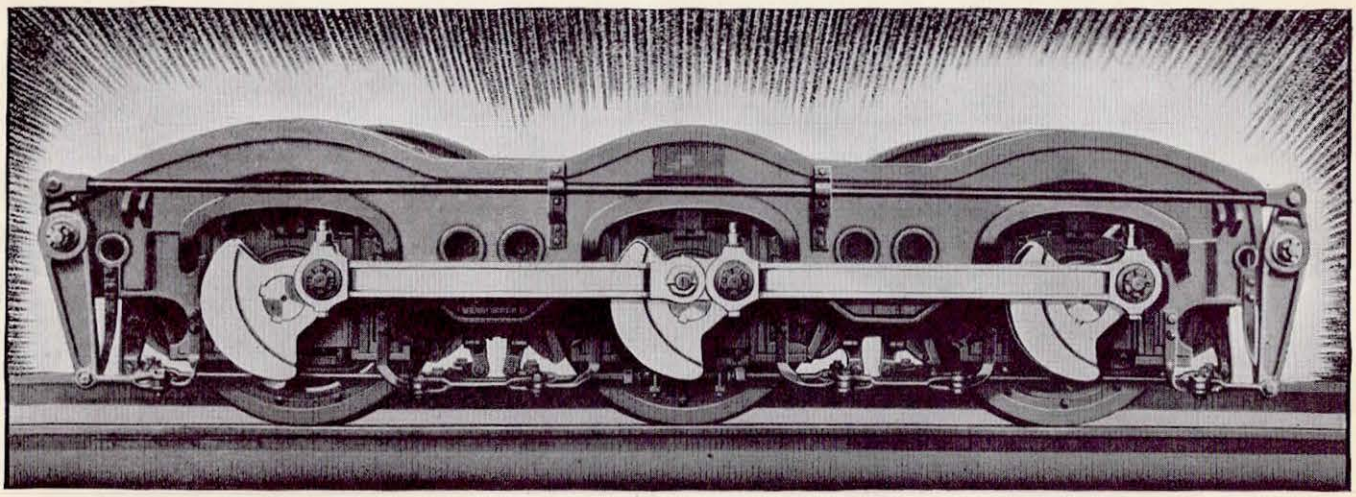
TRADE MARK

EDDYSTONE, PA. GRANITE CITY, ILL.

Published weekly by Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter, January 4, 1933, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.



NEW AUXILIARY POWER FOR NEW OPERATING CONDITIONS



THERE was a time when, if auxiliary motive power helped up to a speed of 12 or 15 miles an hour, it had done its job of getting a freight train well under way.

Not so nowadays, with freight trains traveling at 50 and 60 miles per hour or even faster. To be really effective here, an auxiliary must follow through well up toward the usual running speed of the high-wheel engines hauling the trains. It also needs to be immune to excessive wear-and-tear when whirled along at the highest speeds at which these swift engines ever travel.

The new Bethlehem Auxiliary Locomotive meets these requirements. It gives powerful assistance up to a speed of 25 or 30 miles per hour. With large wheels and short side-rods, it can step along at 100 miles per hour or more, without running up maintenance costs. Six drivers insure ample adhesion. Cylinders are big enough to provide the 14,000 to 18,000 pounds extra tractive force for which the modern locomotive boiler can supply steam in lower speed ranges.

In effect, the new Bethlehem Auxiliary Locomotive turns an Atlantic-type locomotive into a Pacific, and similarly changes other types of locomotives—without adding the maintenance costs that go with the extra pair of drivers and greater weight of reciprocating parts.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.

DIESELS *afloat..in*

RELY ON SOCONY-VACUUM'S

FOR DIESELS: THE SUM OF THESE FOUR SAVINGS

4

1. **Greater Availability**
2. **Reduced Repairs and Maintenance**
3. **Lower Fuel Oil Cost**
4. **Lowered Cost of Lubrication Itself.**

= LUBRICATION PROFIT

THIS DIESEL ELECTRIC has been giving regular service for several years as a unit of one of the world's largest groups of Diesel-electric locomotives, and has been operating with high efficiency and economy with Gargoyle Railroad Lubricants.

GARGOYLE Lubricants

SOCONY-VACUUM INCORP

Factories and on Rails

DIESEL EXPERIENCE!

DURING THE 35 YEARS since we were privileged to work with Dr. Rudolph Diesel in developing for him the lubrication for the first Diesel Engine, Socony-Vacuum has played an important part in every progressive development of Diesel equipment.

Today, as a result, more than 65% of the world's Diesel-driven ships rely upon Socony-Vacuum lubrication. For the largest Diesel in the world . . . and for a high percentage of *all* the Diesels in the world, Socony-Vacuum lubrication is in use.

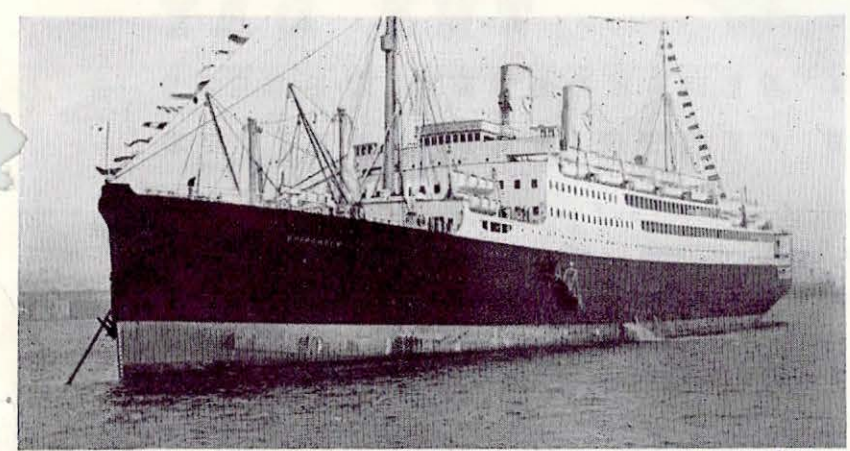
Operators of about half of all the Diesel-electric locomotives built thus far in America have found Socony-Vacuum lubrication an important factor in attaining higher efficiency.

Socony-Vacuum's Railroad Division consists of a group of lubrication and railroad engineers who devote their entire attention to railroad problems. It is serving as consultant to many railroads interested in the economies Diesels make possible. It is this Division's policy to recommend the lowest-cost lubricants consistent with true economy in railroad service—from the standpoint of greater availability, reduced repairs and maintenance, lower fuel oil cost and lower lubrication cost . . . four vital factors in operating with a lubrication profit.

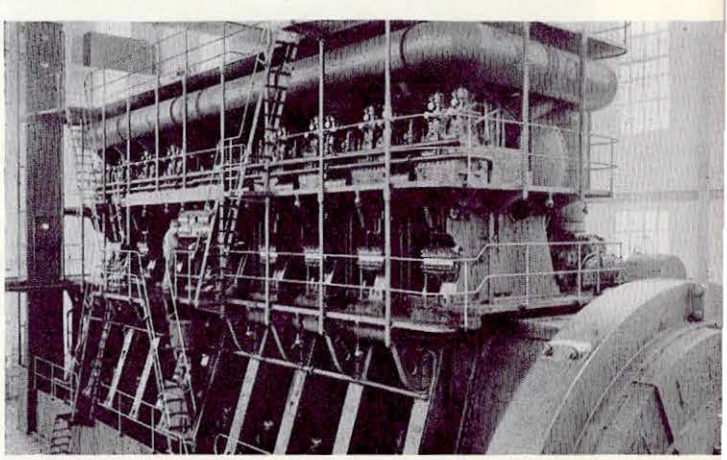
Socony-Vacuum offers a complete line of railroad lubricants. Therefore, your particular requirement will be the sole basis of our Railroad Division engineer's recommendations to your staff.

• • •

Socony-Vacuum quality is uniform throughout America. Socony-Vacuum service is nation-wide in warehousing and in technical cooperation. Your inquiry to the Railroad Division of the Socony-Vacuum Oil Company, Inc., at 26 Broadway, New York, or 59 E. Van Buren St., Chicago, or to any of the companies listed below, will bring you immediately a service which is both convenient and understanding in its efficient cooperation.



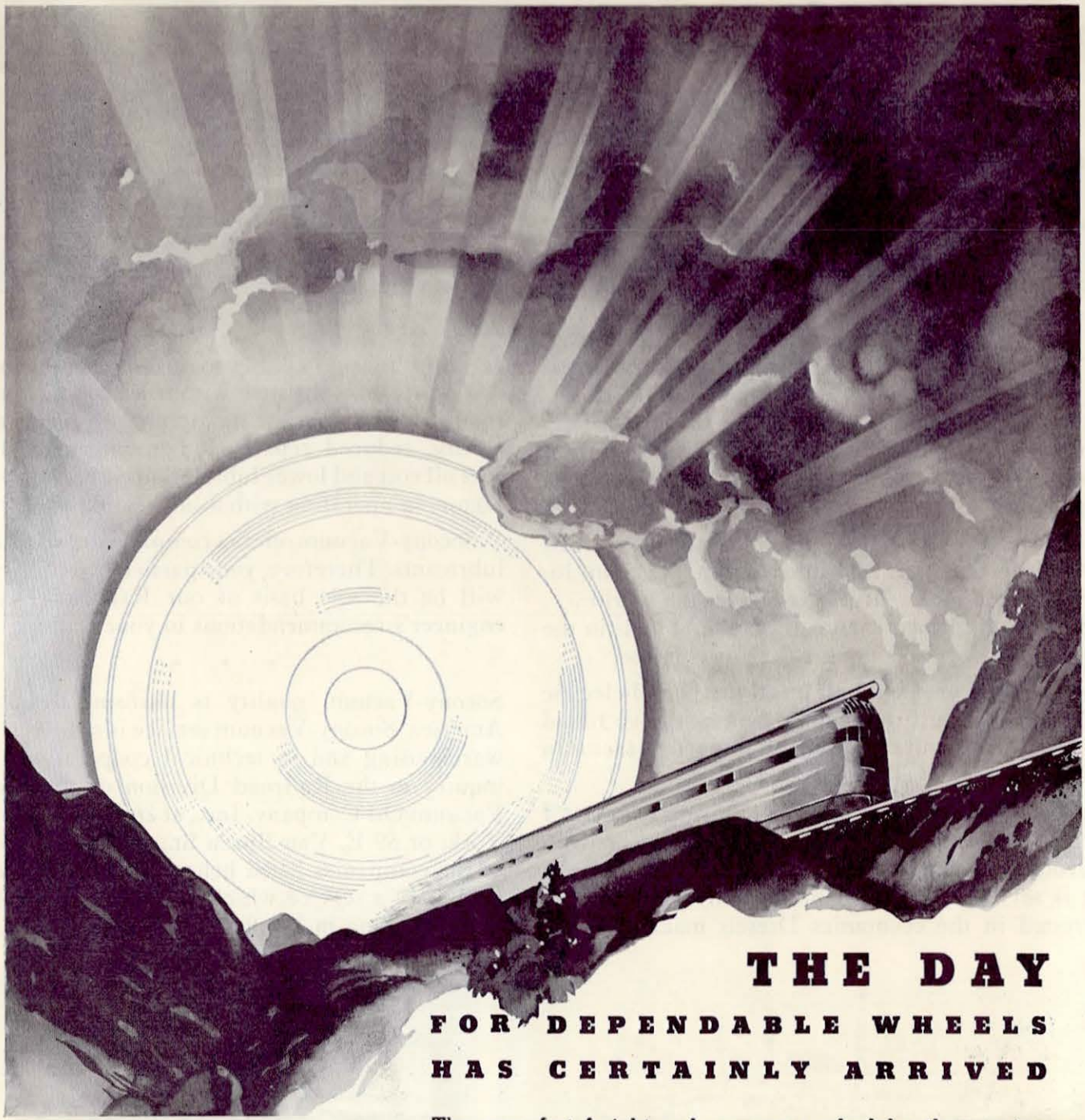
GARGOYLE LUBRICANTS stand first in preference around the world when it comes to lubricating modern Diesel-powered ships.



THIS 15,000 K.W. Burmeister & Wain (operating in Denmark) is the world's largest Diesel! Gargoyle oils are used.

OIL COMPANY
ORATED

STANDARD OIL COMPANY OF NEW YORK
WADHAMS OIL COMPANY
WHITE STAR REFINING COMPANY
LUBRITE REFINING CORPORATION
WHITE EAGLE OIL CORPORATION
MAGNOLIA PETROLEUM COMPANY
GENERAL PETROLEUM CORP. OF CALIF.



THE DAY
FOR DEPENDABLE WHEELS HAS CERTAINLY ARRIVED

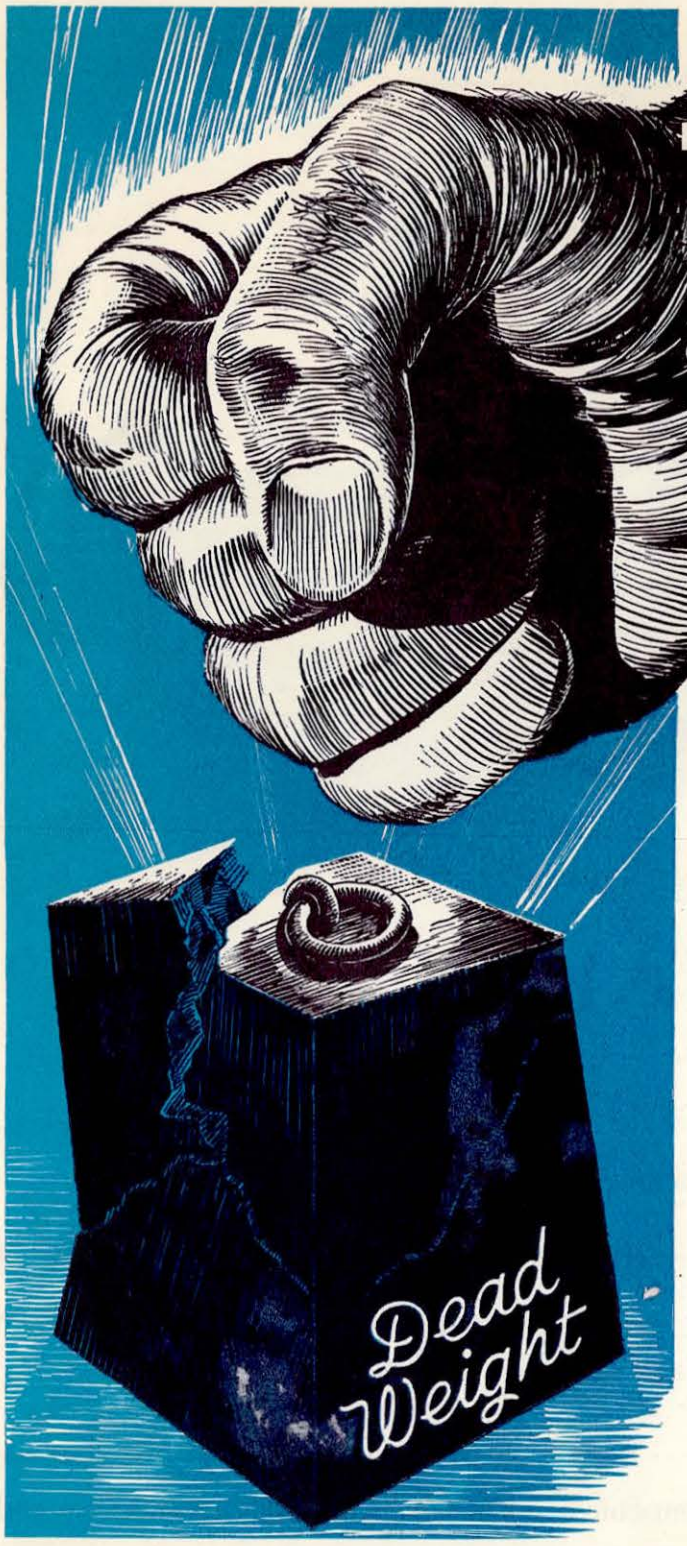
The new, fast freight and passenger schedules throw a tremendous responsibility on wheels. They **must** be dependable. Fortunately Carnegie Wrought Steel Wheels have kept pace with railroad development in weight reduction and higher speed and are fit and ready for any service. Special heat treated wheels for passenger and engine tender service. Single and multiple-life wheels for freight service. Let us solve your wheel problems.

310

CARNEGIE STEEL COMPANY • PITTSBURGH

Wrought Steel Wheels also manufactured by **ILLINOIS STEEL COMPANY • CHICAGO**

United States Steel USS *Corporation Subsidiaries*



TRANSPORTATION Deals a Mighty Blow for ECONOMY

USS HIGH TENSILE STEELS, far stronger, much more resistant to atmospheric corrosion, give transportation a powerful weapon with which to beat down the barriers to economical operation. Freight cars of great strength, designed efficiently with these High Tensile Steels, are built light so they can carry a larger pay load without added expense.

USS COR-TEN is a low chromium copper silicon steel, available in the same forms as mild steel. USS 18-8 is, of course, the superlative material in the weight-reduction series.

The atmospheric corrosion resistance of USS COR-TEN is based upon ACTUAL TESTS extending over a period of years in several different atmospheres. Our statements are based on this actual experience, rather than upon accelerated or laboratory tests.

USS High Tensile Steels are supplied in plates, shapes, bars, strip, sheets, rods, wire and wire products, pipe and tubular products. Literature and information sent upon request.

Address the Following Manufacturing Companies

AMERICAN SHEET AND TIN PLATE COMPANY, *Pittsburgh*
AMERICAN STEEL & WIRE COMPANY, *Chicago*
CARNEGIE STEEL COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
COLUMBIA STEEL COMPANY, *San Francisco*
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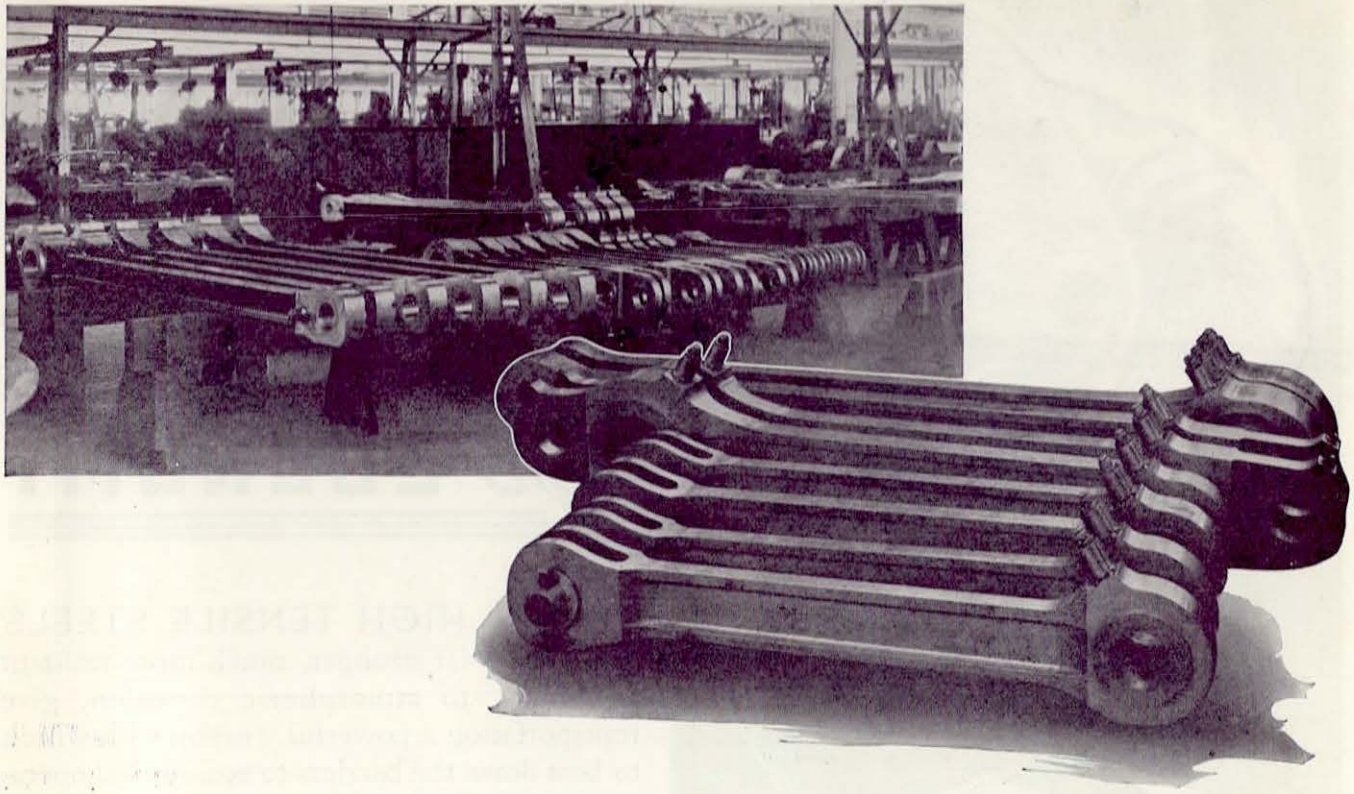
United States Steel Corporation Subsidiaries

USS HIGH TENSILE STEELS



HIGH QUALITY –

is essential for true economy when purchasing vital locomotive parts such as connecting rods.

Their true cost must be measured in terms of the miles of satisfactory service delivered—in freedom from road delays and expensive detention in shops.

Even from the point of view of first cost we can offer competitive prices for high quality in materials and workmanship.

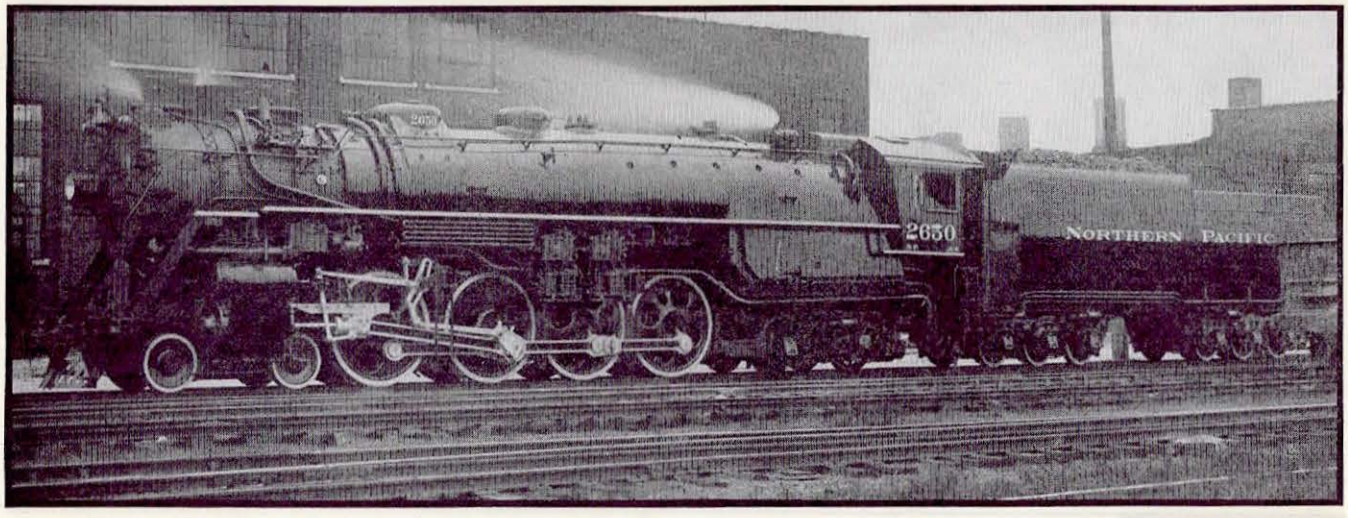
May we not quote on your requirements for connecting rods?

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA

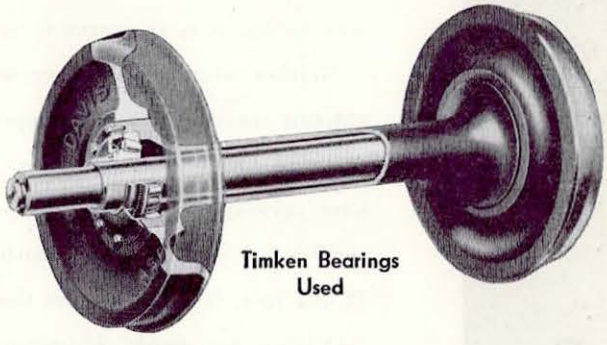
GIANT NEW NORTHERN PACIFIC LOCOMOTIVE

Meeting Present Day Demands for Sustained Speed and Dependability



American Steel Foundries Roller Bearing Units are used on all tender positions and on the front trailers.

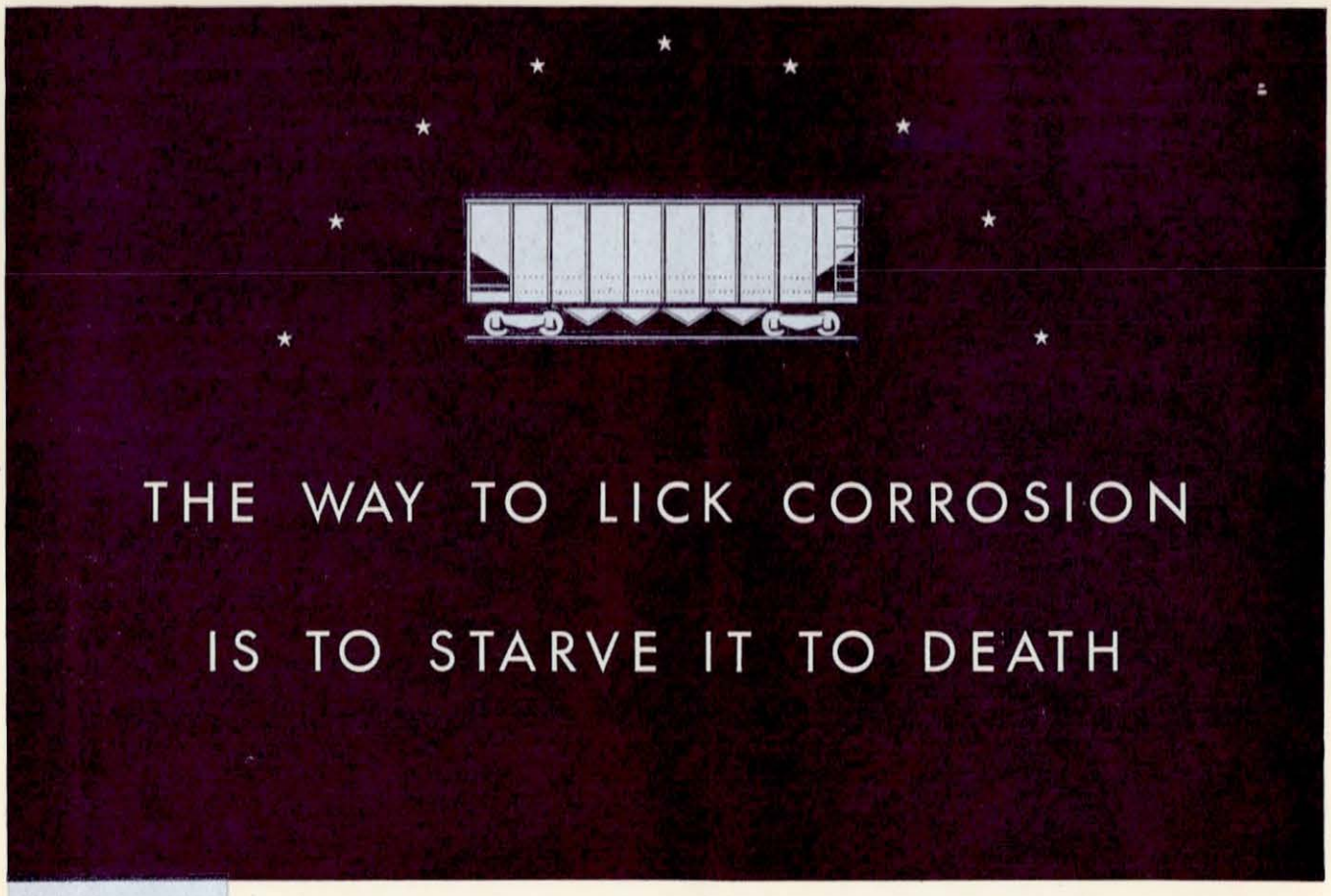
This locomotive is one of ten recently built for the Northern Pacific Railroad. Each locomotive has a weight of 857,900 pounds and the tender has a capacity for 27 tons of coal and 20,000 gallons of water.


Timken Bearings Used

The famous North Coast Limited train, with its Roller Bearing Unit equipped Pullman cars and Diners, is being handled by these fully equipped roller bearing locomotives on a continuous run of 906 miles between Jamestown, North Dakota and Missoula, Montana.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



THE WAY TO LICK CORROSION IS TO STARVE IT TO DEATH

ALCOA

● Corrosion is a ravaging disease that cannot be cured with ointments. The way to lick it is to starve it to death.

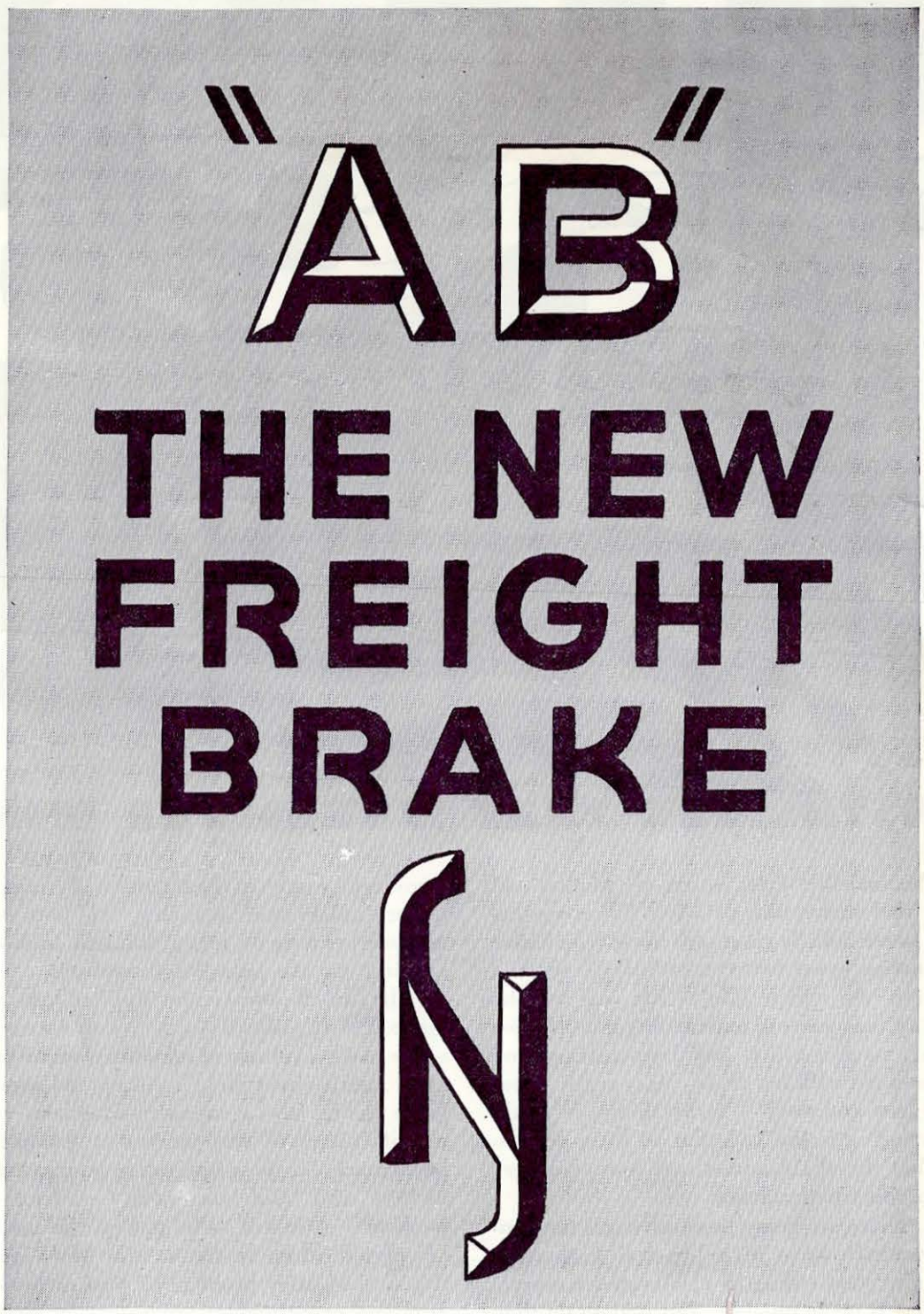
Neither atmospheric corrosion nor sulphur corrosion has any appreciable appetite for Alcoa Aluminum. Chemistry says so. Tests prove it. Operating records of coal cars substantiate it. It is a fact. Nature made it that way.

Nature also made Aluminum very light. And research has made it very strong. It is perfectly logical that railroad men should now be using Alcoa Aluminum as a chief weapon in the industry's own attack on the economic absurdity of too-heavy freight cars that will not stand up against corrosion.

Our job has been to make Alcoa Aluminum available in every needed form as economically as possible; to develop the know-how, and to make that know-how available to the entire industry. Operator, engineer, and car-builder all are invited to turn that know-how to their own advantage. Address ALUMINUM COMPANY OF AMERICA, 1878 Gulf Building, Pittsburgh, Pa.

ALCOA ALUMINUM

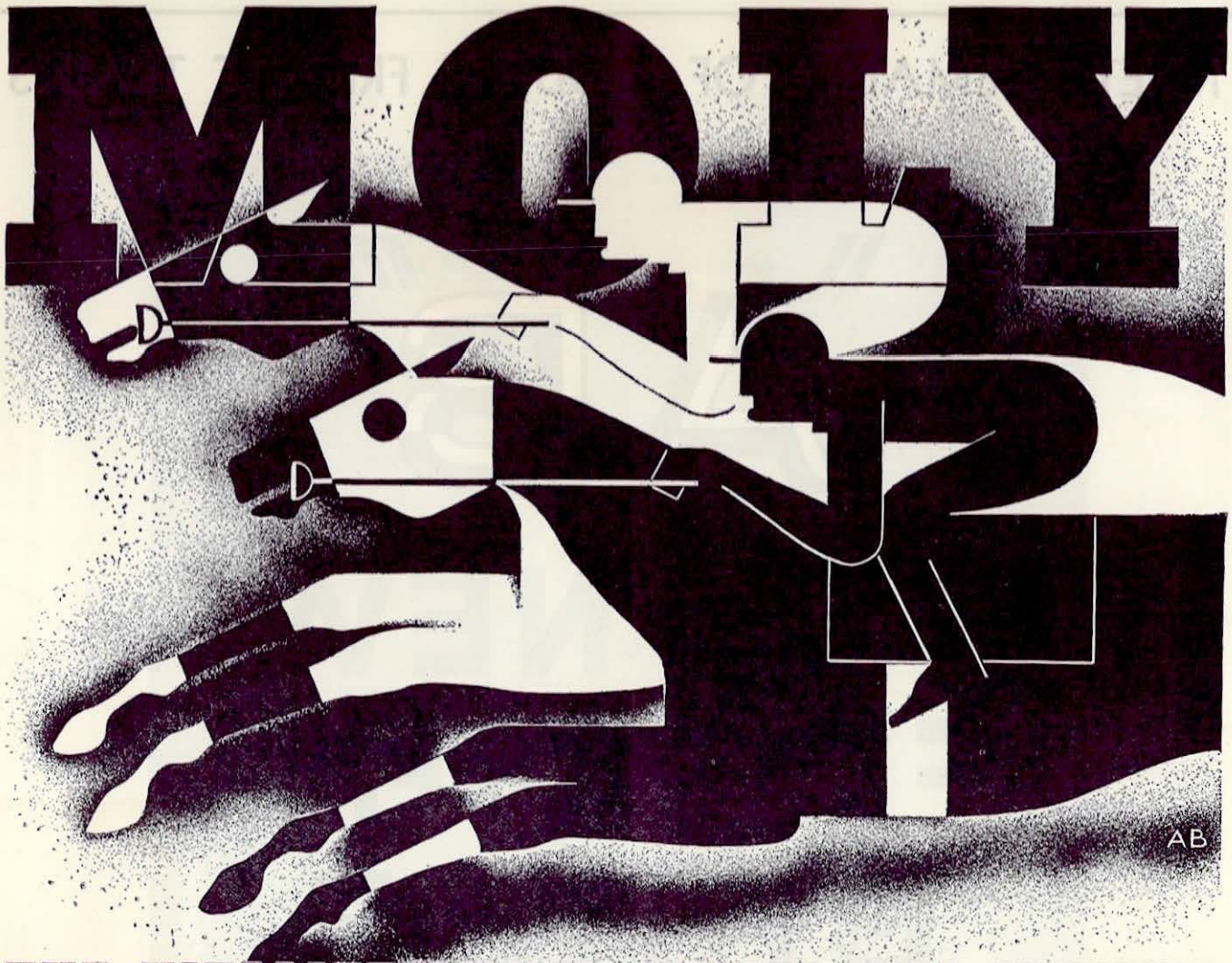
MEETS DEMANDS OF MODERN FREIGHT TRAINS



FOR NEW OR EXISTING EQUIPMENT
NEW EFFICIENCY INSURES MULTIPLIED ECONOMIES

THE NEW YORK AIR BRAKE COMPANY

420 LEXINGTON AVENUE • NEW YORK CITY • PLANT—WATERTOWN, N. Y.



THE VITALIZER THAT MAKES THE WINNER

It is often the invisible extra spirit or infinitesimal extra energy that makes the priceless difference between "a race horse" and "a *great* race horse." A similar striking distinction exists between ordinary irons and steels and those into which "Moly" has injected the spark of virility that leads to outstanding qualities for strength, wear, machinability, easy heat-treating, and toughness combined with hardness. Moly really "does something to iron and steel"— many things, in truth. Even more amazing is the fact that so little does so much; and that the slight added cost is repaid over and over in product betterments.

Example: There are many pearlitic steels not containing Moly, which have high physical properties. They even show good strengths at elevated temperatures, if the test is made quickly. But seldom do they hold up over long periods at such temperatures. Accordingly, their "creep strength" is low. Add Moly to such — or *any* — steels, and the "spark of life" introduced results in the retention of strength and form under similar conditions. Results of both experimental and service tests on many different high-temperature applications are yours for the asking.

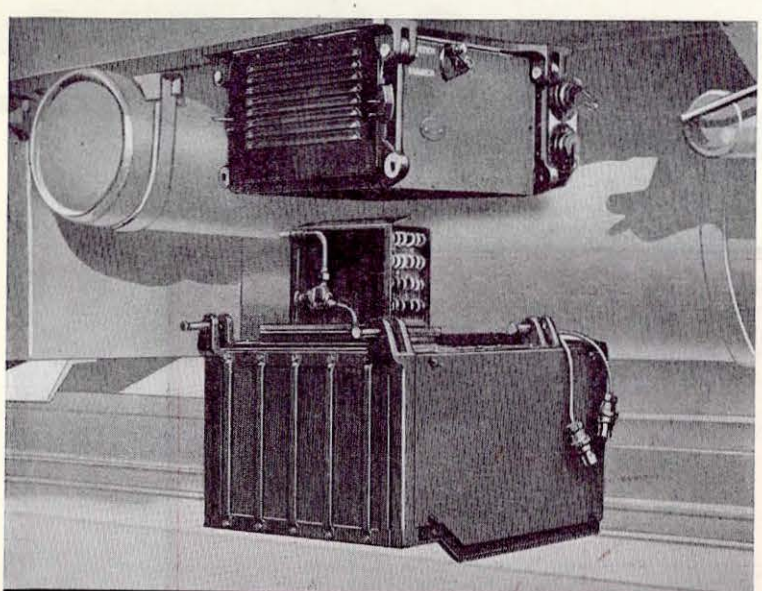
The developments and applications which have marked Moly's fifteen years of progress would in themselves make a volume of metallurgical history. Investigate. Learn about Moly's widespread uses and acceptance among steel companies, foundries, tool makers, manufacturers of steel-fabricated products. WRITE particularly for these interesting books: "*Molybdenum in* 1934" and "*Molybdenum in Cast Iron* — 1934 *Supplement.*" Also ask to be put on the mailing list for our periodical house organ, "*The Moly Matrix.*" And, if you've an alloy problem of your own, our metallurgists and experimental laboratory in Detroit will be glad to help you. Climax Molybdenum Company, 500 Fifth Avenue, New York City. (In Canada: Railway & Power Engineering Corp., Ltd.)

CLIMAX Mo-lyb-den-um

WAUKESHA-MELCHER MULTIPLE UNIT SYSTEM OF *Air Conditioning* FOR RAILWAY PASSENGER CARS

The Waukesha-Melcher Multiple Unit System is a most flexible and economical method of air conditioning old or new railway passenger cars of all sizes and types—cooling and filtering the air in summer, heating and filtering it in winter.

Each air unit is a complete, self-contained air conditioning plant, thermostatically controlled. Units may be readily installed in existing cars, in the railway's own shops by their own men. No major changes are required in car construction. Four units completely condition an average car.



Cooling section being removed with mounting plate and air section remaining attached to car

All units and sections are identical and readily interchangeable. No expert labor is needed. Use of spare units eliminates necessity of taking car out of service for repairs, or maintaining service organization over entire railway system.

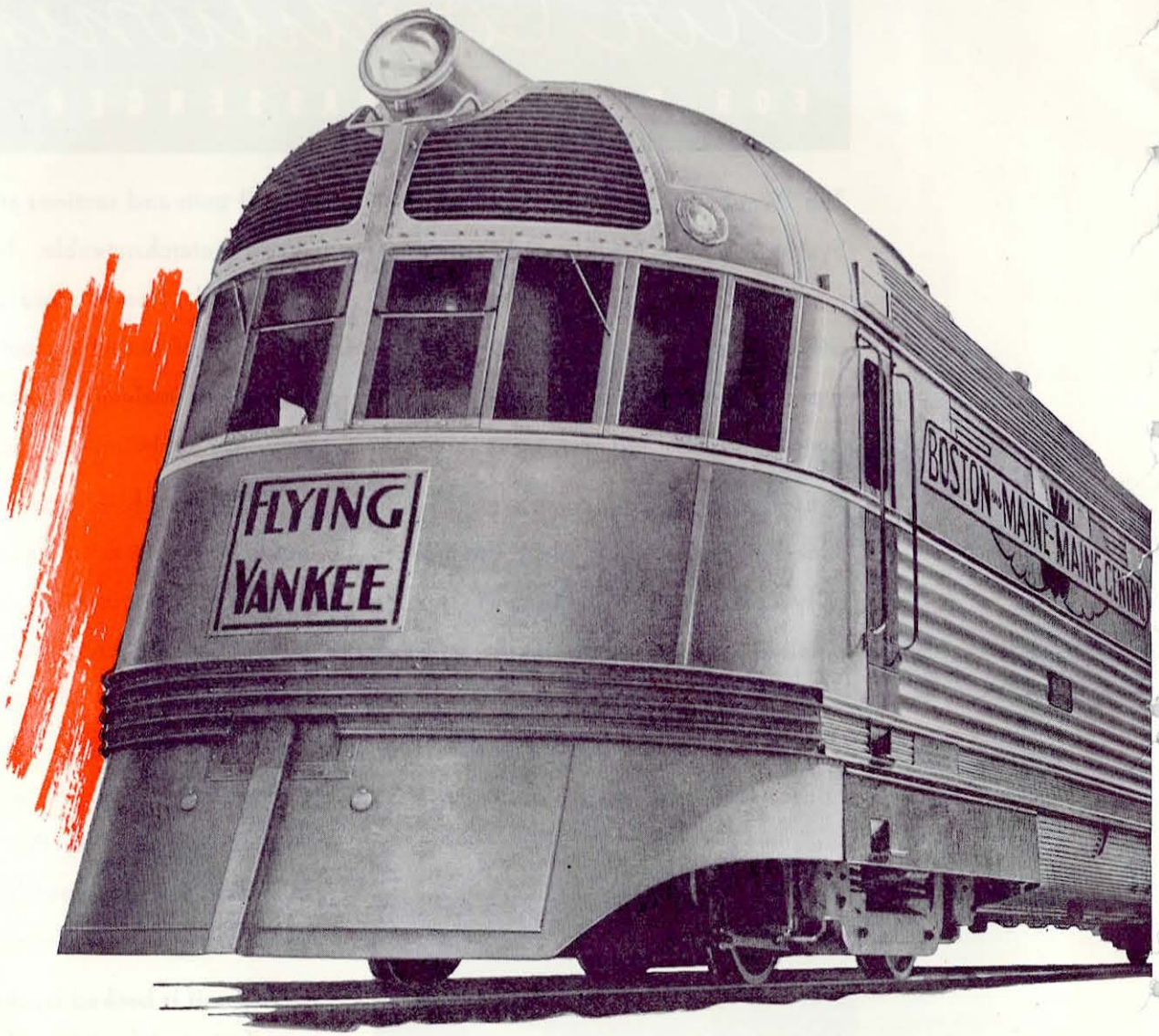
The Waukesha-Melcher Air Unit is the result of four years' development, with units in continuous, active service. Its exclusive design incorporates features which have proven their advantages in the installation, operation and maintenance during these years. As a result, railways who are familiar with this successful performance, are now specifying this equipment for their requirements.

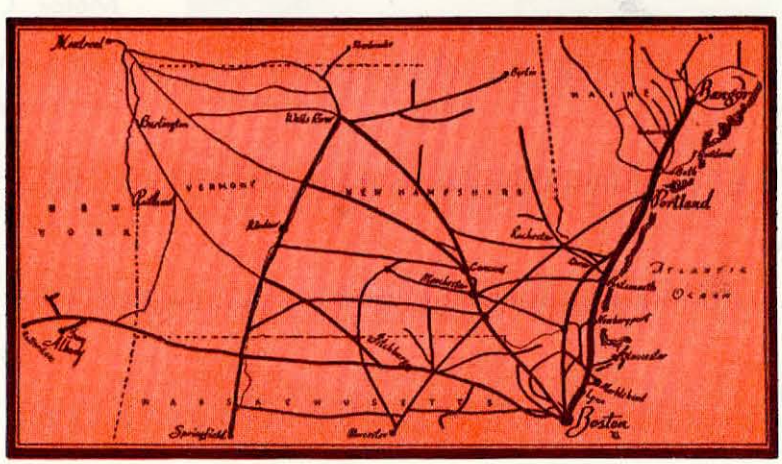
This unit is backed by the resources and manufacturing facilities of the Waukesha Motor Company—the world's largest builders of heavy-duty internal combustion engines.

Write today for Bulletin 961. It will give you the complete details.

WAUKESHA MOTOR COMPANY
Refrigeration Division
WAUKESHA : WISCONSIN

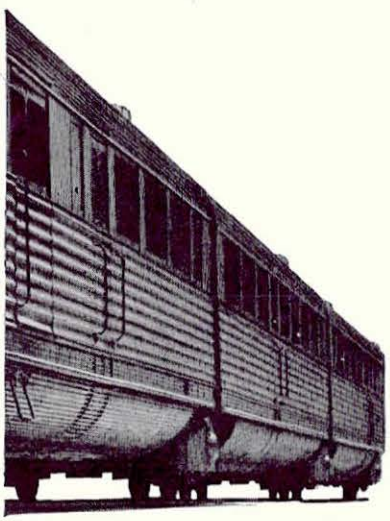
TIDE WATER OIL





selected to lubricate...

The FLYING YANKEE



The first streamlined train to serve New England will be lubricated with Tide Water products. The "Flying Yankee", crack Boston-Portland-Bangor express of the Boston and Maine Railroad and the Maine Central, will depend on Tide Water Oils for this important function. Built by Budd and powered by Winton, a division of General Motors, the "Flying Yankee" will re-dimension the map of New England.

Just as these railroads are pioneering in safe, speedy transportation in this section of the country, Tide Water pioneered in the field of lubrication.

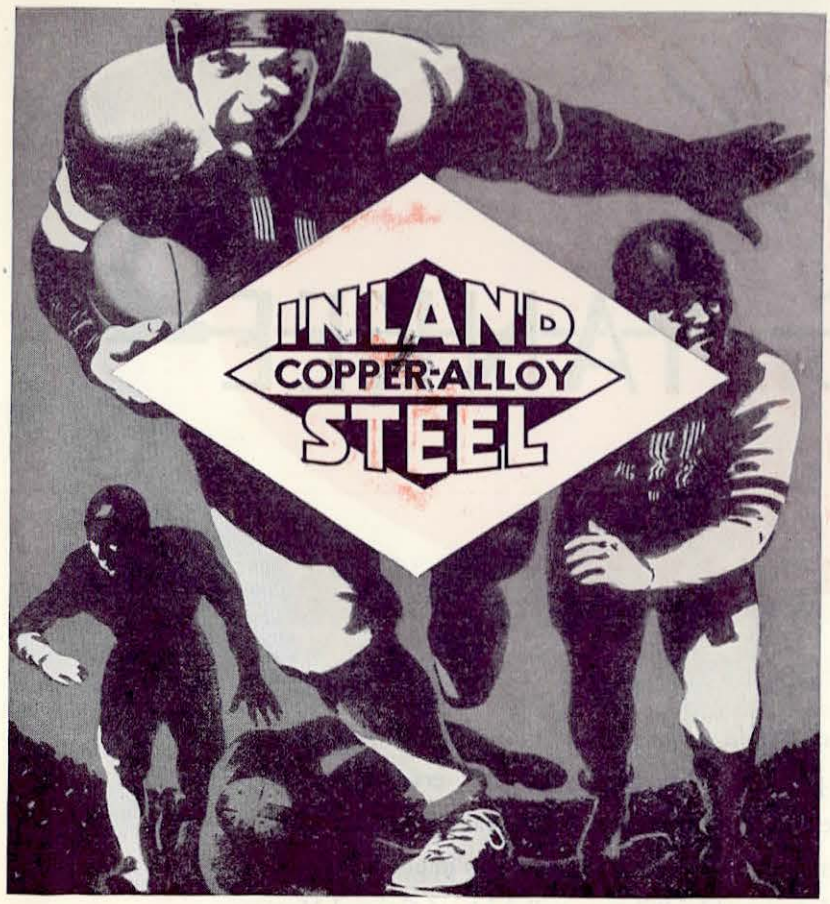
Not only the 660 h.p. Winton Diesel-electric power plant of the "Flying Yankee" is Tide Water lubricated, but also all vital parts of the train. Inasmuch as this streamlined unit will be capable of a speed well over a hundred miles per hour, the selection of the right lubricant was of paramount importance. The reputation and experience of Tide Water as manufacturers of high quality products are guarantees that this problem has been met in the most effective manner.

TIDE WATER OIL COMPANY

17 Battery Place, New York, N. Y.

MANUFACTURERS OF VEEDOL MOTOR OILS AND TYCOL INDUSTRIAL LUBRICANTS

As BRAWN helps the FULLBACK FIGHT for TOUCHDOWNS . . . . COPPER helps STEEL



Fight CORROSION *Fight* COSTS *Fight* FOR SALES

IT is beyond the ability of the average youth to become a star fullback. That takes extraordinary brawn. Likewise ordinary steel is inadequate to fight corrosion. But put copper in steel, as is done in Inland Copper-Alloy Steel, and a modern material with outstanding advantages is secured.

Copper-bearing steel endures longer than any ordinary grade of iron cr steel—on any application where there is any moisture.

It costs approximately five per cent more than ordinary steel—less than any other corrosion-resisting material, far less than most. Its extra years of life returns its small additional cost many times over.

It imparts to the products for which it is used the most universal sales appeal of all—extra value per dollar.

Inland Copper-Alloy Steel should be used for every application of steel where corrosion is a factor: for roofs, smokestacks, and kindred uses about your plant—as well as for use in your products. It is available in sheets, bars, plates, structurals, any Inland steel product.

NRA CODE

INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago, Ill.

BUREAU OF STANDARDS ON EFFECT OF COPPER

In circular letter No. 253 of September 13, 1928, the U. S. Bureau of Standards quotes Dr. F. N. Speller's book *Corrosion—Sources and Prevention* in summarizing the effect of the composition of steel on its corrodibility. Dr. Speller states that copper increases the corrosion-resistance of steel exposed to atmospheric conditions— that the effect of copper is much more marked than the purity of iron or steel.

INLAND STEEL

Sheets Strip Tin Plate Plates Structurals Piling Rails Track Accessories Bars Rivets Billets

Published every Saturday by the Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa., with editorial and executive offices: 30 Church Street, New York, N. Y., and 105 West Adams Street, Chicago, Ill.

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The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Subscriptions, including 52 regular weekly issues, payable in advance and postage free: United States and possessions, 1 year $6.00, 2 years $10.00; Canada, including duty, 1 year $8.00, 2 years $14.00; foreign countries, 1 year $8.00, 2 years $14.00.

Single copies, 25 cents each.

Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office

Vol. 98 February 16, 1935 No. 7

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for Railroad Service

TONCAN IRON

..THE PIPE WITH ADDED CORROSION RESISTANCE

Railroad pipe is buried in cinders, exposed to weather, to sulphurous smoke and to brine drippings. Shock and vibration try their best to shake it to pieces.

Ordinary pipe is helpless in the face of these assaults whereas Toncan Iron Pipe is specially fitted to withstand them.

Toncan Iron is an alloy of refined open hearth iron with copper and molybdenum and possesses the maximum rust-resistance of any ferrous material in its price class.

On board great ocean liners Toncan Iron has proved its resistance to salt corrosion, while chemical plant service has established its longer life in corrosive fumes and gases.

Toncan Iron Pipe has a homogeneous structure that resists vibration and shock.

All of these characteristics result in longer life, less repairs and lower cost where railroads specify pipe of Toncan Iron.

TONCAN COPPER MOLYBDENUM IRON PIPE

Republic Steel CORPORATION

GENERAL OFFICES: YOUNGSTOWN, OHIO

REPUBLIC STEEL

RAILWAY AGE

Passenger Traffic— A Problem or an Opportunity?

The men at the top of the railway industry, who determine its general policies, are the ones who must be looked to for a solution of the passenger traffic problem. Departmental officers have a part to play—an important one—but the difficulty is one which transcends the conduct of any one department and involves the policy and attitude of the industry itself. Passenger revenue in 1934 was approximately 340 million dollars, representing a decline of 70 per cent from passenger revenue in 1923. By contrast, freight revenue in 1934 was only 47 per cent less than in 1923. If passenger revenue had declined only in the same proportion as freight revenue, it would last year have totaled 607 millions. Readers of the *Railway Age* do not need to be told what 267 millions more in gross revenues would have meant to the railways last year—in greater employment, in better credit, in retrieving the assets which they have in pawn with Uncle Sam.

Motor Industry's Primary Skill Is Merchandising, Not Technology

The reason, also well-known, for this vast loss of business was the development of automotive transportation. This development resulted from some technological progress, but for the most part it is ascribable to the vast outpouring of billions of dollars of taxpayers' money for highway construction, coupled with a merchandising campaign of colossal magnitude and comprehensiveness. Indeed, the merchandising campaign, by reason of the vast sums spent for advertising —editors and publishers being human—undoubtedly had a great deal to do with softening public opinion toward the gigantic tax burden it was assuming for highway construction.

In the face of competition which has shown such genius in finding the way to the public's good graces and to its pocketbook, there are two possible attitudes. One is a conviction of inferiority and defeat. The other is the realistic and sensible one of profiting from the successful competitor's experience. After all, there is no magic in the great accomplishment of the automotive industry. It has followed entirely from the courageous and intelligent employment of a familiar technique. What the automotive industry has accomplished, another industry, intelligently applying similar methods, can do as well.

Market Possibilities Unknown Until They Are Tried

The railways have not lost their passenger traffic irrevocably. The automobile took a great deal of traffic away from the railroads, but most of its business has come from the development of a tremendous latent travel market which the railways never reached. The possibilities of this market have not been exhausted by any means. They will not have been exhausted until railroad service, as attractive and as economical as it can be made, ceases, after intensive exploitation, to draw increased patronage. As long as there is room for improvement in the attractiveness, economy and sales exploitation of railway service, then that service affords opportunities for making money. Will anyone deny that such opportunities exist, and in handsome measure, on the railroads today?

Fortunately it is not necessary to leave the answer to that question to speculation. Facts and figures from railway experience point unmistakably to the answer. In 1934 the railways began to make legitimate news with their passenger service. They introduced high-speed and streamlined trains and rate experiments in which newspaper editors recognized that their readers would be keenly interested and to which, consequently, they gave generously of their space. Such publicity is cumulative in its effect. Each development engages the attention of a wider public than the one which preceded it. The result was that, in 1934, for the first time since 1923, passenger traffic and revenue showed an increase over the preceding year. Moreover, the increase in volume (though not in revenue) was greater

than that in freight traffic. When it is recalled that freight traffic in 1933 exceeded that of 1932, while passenger traffic in 1933 nevertheless continued to decline—plainly the reversal in the passenger traffic trend which did not begin until 1934 must be ascribed to steps taken to make the service attractive in 1934 which were not taken in such measure in 1933. What were these steps? Air conditioning, fare reductions, faster speeds, unit motor trains—all these deserve a share of the credit, but to them must be added the generous welcome which the press and public accorded to these developments.

Methods of Rebuilding Business Already Proved

The railways desperately need the additional revenues which a revived passenger traffic would give them. They have themselves proved, by a slight sampling, the efficacy of methods by which such traffic can be attracted. They have before them the example of the automobile and other industries which have become rich by finding what the public wants and giving it to them in unlimited quantities at a price within their reach. There is every reason, then, why the railways should proceed forthwith with a major offensive on all fronts to attract into their coffers money which the public is plainly so willing to part with.

The Passenger Traffic Report recently issued by Co-ordinator Eastman's Section of Transportation Service has appeared at an opportune time. That report (an article upon which appeared in the *Railway Age* of January 26) is a mine of information, much of which has heretofore not been available, on the characteristics of passenger service and the steps which need to be taken to make that service one of vastly enlarged popularity with the public and, as a consequence, a source of a handsome increase in railway earnings. We are not endorsing the report in its entirety. Indeed, regarding some of its recommendations we are extremely skeptical. Nevertheless, no one can read this study without learning a lot about the passenger business which he did not know before. Moreover, we do not believe that any open-minded person who studies the report will fail to agree that in its major recommendations lies the solution to one of the most troublesome problems which face the railroads today.

The economics of the situation are simple. Operating costs per passenger car-mile average 28 cents. In 1933 the average revenue per car-mile was only 20 cents. The solution to the problem, expressed in its simplest terms, lies in bringing the average revenue per car-mile up above 28 cents per mile wherever improved service, lower rates and merchandising skill can do so; and, where such methods do not meet that objective, then abandoning the service to other forms of transport. Actually, of course, the problem is much more complex than this, involving the attraction of specific passengers, by specific services and rates, to specific trains. Methods of accomplishing this result are analyzed in the report and need not be gone into here. But the facts adduced go a long way toward justifying the belief that passenger service can be turned from a losing business into a profitable one by modern merchandising and scientific pricing, and by closer attention to costs.

The Question of Free Transportation

We are not convinced by the arguments the report advances against free transportation provided railway officers and employees—to the extent that such transportation is restricted to persons loyal to the business which provides them a living. It would be difficult to prove that such free transportation costs the railroads any appreciable sum, or that railway revenues would be materially increased if the privilege were withdrawn. But such free transportation ought to be treated as a privilege and not as a right. Labor leaders en route to a meeting to plot the destruction of the railroad industry certainly ought not to be permitted to travel on free transportation provided for them by the railroads, any more than should General Ashburn be accepted as a legitimate "deadhead" by the railroads, as he is reported to be. The railroad business is peculiar in its wide extension. The pass privilege to some extent overcomes this handicap to mutual understanding. Perhaps it should be done away with, but, unless this step would add far more to railway revenues than appears likely, we believe it is a privilege which might be retained for the benefit of loyal employees.

The report shows in how many different ways wherein greater joint sales effort by the railways is needed. The big selling job to be done is not to induce passengers to ride one particular railroad instead of another, but rather to induce them to ride any railroad rather than some other form of transportation. Railroad sales organizations and railroad advertising (what there is of it) are still directed primarily at inter-railroad competition. The Association of American Railroads obviously has a great opportunity offered it in this need of the industry. Market analysis, pricing and a great deal of the sales effort needed to restore passenger traffic is a job, not for the individual carrier, but for a central organization such as the A.A.R.

A.A.R. Logical Agency for Joint Sales Campaign

There is needed a great sales and advertising campaign to sell railroad service in competition not only with other forms of transportation, but in competition with other commodities and services. No one railroad would care to undertake the task of publicizing the safety and reliability of rail travel as contrasted with the danger and unreliability of their competitors. But the Association of American Railroads could, and we believe should, put the comparative facts before the public forcefully and continually. (Consider, for example, the savage criticism in the press of one railroad which experienced difficulties in keeping its trains on time during the recent blizzard along the Atlantic seaboard—in contrast with the equanimity of the same papers at the fact that competing forms of transportation suspended service completely!)

The expenditures of all the railways for national advertising in 1933 were only $300,000, or less than was spent for this purpose by one bus line alone or by a steamship company operating but four boats. Total advertising expenditures in that year totaled seven millions, but most of this went for time-tables and such purposes, leaving a pitifully inadequate sum for truly creative outlay. Under the interpretation of the law as it stands, the railways are not permitted to exchange transportation service for advertising space. This law ought to be changed. There are plenty of publishers who might use more railway service if they could pay for it. At the same time, the railroads have a surplus of transportation capacity on their hands while they stand badly in need of advertising. We are not suggesting the introduction of the "due bill racket" into railroad transportation, but safeguards could be set up to avoid such abuses. Certainly it does not make sense that a man should be prevented from trading a commodity of which he has a surplus for a part of another's surplus—a transaction which enriches both participants.

Personnel Problem Presents Serious Difficulties

Railway personnel is not dealt with any too generously in the passenger traffic report—not that individuals are found intrinsically unfit for their jobs, but rather that the system of selecting and training men is at fault. The observation is made that the common method of selection seems to be "promote all present officers and employees one rank and hire a new office boy." Just how an alert, highly competitive sales and service industry with every man in precisely the job to which he is suited can be reconciled with the elaborate union rules and the seniority principle obtaining on the railroads is one problem which Mr. Eastman's research staff has managed to evade. But is it not a pretty fundamental difficulty, if the railroad industry is to be revamped to meet competition which knows no rules except to get the customer's money in any manner the law will permit?

We could find a great deal more in the Report on Passenger Traffic with which to take issue—and much more than that to commend. But the report itself should be read, rather than second-hand excerpts from it, by every man in the railroad business who has anything to do with the subject matter with which the report deals. It is not "just another report." It is a document which calls for action—immediate and thoroughgoing.

Indexes to Volume 97

The indexes to the latest volume of the *Railway Age*, July to December, 1934, are now ready for distribution and copies may be had by those subscribers desiring them. Requests should be addressed to the Circulation Department, *Railway Age*, 30 Church street, New York. Subscribers who have in previous years made application for the index need not apply again; they will continue to receive it as long as they continue to subscribe.

Increase in Car Loadings Continues

Car loading statistics show continuance of the improvement in general business which began in November. The increase in loadings in the week ended February 2 was relatively the largest since the improvement began.

The seven months recession of loadings that commenced in April reduced them from about 64 per cent of the 1925-1929 average in March to about 55 per cent of that average in October. They increased to almost 57 per cent of it in November, to almost 60 per cent of it in December and to more than 60 per cent of it in January. In the week ended February 2 they were 64.3 per cent of the 1925-1929 average, or relatively larger than in any week of 1934 excepting one week in March and one in April. They were 6 per cent larger in the week ended February 2 than in the corresponding week of 1934, 23 per cent larger than in 1933 and 4.2 per cent larger than in 1932.

Statistics regarding the groups of commodities in which increases or decreases of loadings occurred in the week ended February 2 give significant indications of recent trends in both railroad and general business. Loadings of both grain and live stock were less than in 1934, doubtless owing to effects of the great drouth last year. Loadings of L.C.L.-merchandise were less than in either 1934 or 1933, which doubtless reflects the increasing inroads of truck competition. Coal loadings increased 16 per cent over 1934 and 45 per cent over 1933. Forest products loadings increased 21 per cent over 1934 and 69 per cent over 1933. Loadings of miscellaneous freight, which consists principally of manufactured products, increased 11 per cent over 1934 and 37 per cent over 1933. There was also an increase in ore loadings, but shipments of it always are small at this time of the year.

The groups of commodities the loadings of which increased plainly indicate expansion of industrial production and of construction. The increase of forest products shipments undoubtedly is mainly due to enlargement of the demand for lumber caused by passage of the National Housing Act, the most constructive piece of legislation yet enacted to promote business recovery.

If the increase of car loadings which has been occurring for more than three months continues railroad freight business will soon be substantially larger than since 1931.

The New Light Weight Ballast Floor in Service on the Allegheny River Bridge

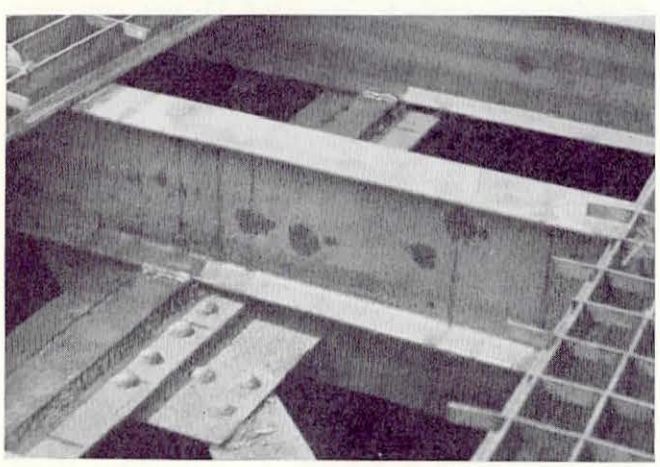
Use Light Weight Ballast Floor on Bridge Designed for Open Deck

Bessemer & Lake Erie overcomes fire hazard on large bridge over Allegheny river without imposing excessive loads

THE necessity for the renewal of the open-type wooden deck of the Bessemer & Lake Erie's bridge over the Allegheny river led to studies for the development of a ballasted deck that would be light enough to preclude any overloading of the structure, and this investigation resulted in the adoption of an ingenious design involving the use of Carnegie T-Tri-Lok construction. This type of floor had been previously employed on highway structures, but it proved entirely applicable to the requirements of railway loadings and offered an effective solution for a perplexing problem.

An Exceptional Structure

The bridge, which was built in 1918, is a structure of more than ordinary proportions, including, as it does, two groups of three spans each that are continuous over two supports, and having a total length of 2,327 ft. 3½ in. It is, moreover, a double-track deck structure with the tracks about 160 ft. above the water level in the river. The floor system was dimensioned for double tracks at 14 ft. 11 in. center to center, with two stringers for each track 6½ ft. center to center. In addition, safety stringers, which serve also as the outer supports for sidewalks, were provided 5 ft. 9 in. outside the outer track stringers. These six stringers served as the support for 10-in. by 12-in. untreated ties 36 ft. long, spaced 14 in. center to center. The plank walks on each side were protected by railings, consisting of square wooden posts bored to receive three lines of 2½-in. pipe.



Construction View, Showing Welding of Fillers to Tops of Stringers, and I-Beams to the Fillers

Studies for the renewal of this floor had convinced the officers of the railroad that the replacement should be in other than an open wooden deck. This conclusion was due to the recognized fire hazard of the existing deck, which had increased markedly with the aging of the timbers, but which had been deemed serious enough from the start to warrant the employment of 24-hour watchman service and the installation of a fire-fighting system by using the bottom pipe in each hand rail as a water line with hose outlets at convenient intervals, and supplied with water by a pump on the river bank under automatic push-button control, and with adequate capacity to deliver water through a 2½-in. hose at 60-lb. pressure in 2 min.

Concrete Deck Proved Too Heavy

Consideration was naturally given to the possibility of a ballasted-deck, but this at once introduced the question of the added dead load on a structure designed for an open-deck, and studies indicated a weight of 7,400 lb. per running foot of bridge for a precast reinforced concrete slab deck, complete with ballast and track, compared with 1,900 lb. for the old deck. The superstructure of the bridge is of silicon steel proportioned for unit stresses 40 per cent higher than those for ordinary structural steel, or a basic stress of 22,400 lb. per sq. in. in tension. However, as the structure was designed for

E-75 loading with an allowance for impact that is very liberal, considering the speed of operation, and since a basic stress of 24,000 for silicon steel is now generally approved, the use of an appreciably heavier floor would not result in excessive stresses, although a floor weighing as much as 7,400 lb. per linear foot was clearly prohibitive.

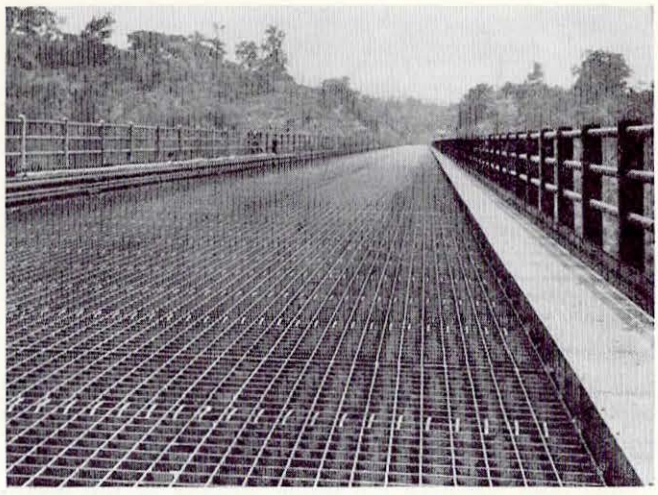
These considerations led to further studies that terminated in the adoption of a design embodying the use of the Carnegie Steel Company's T-Tri-Lok floor. This construction comprises a steel grid composed of T-bars placed stem up with the edges of their flanges in contact, and held together as a rigid, portable unit both by small flat bars set perpendicular to the T-bars in curved slots punched out of the stems of the latter, at a spacing of about four inches, and by metallic arc welds 4 in. long between adjacent T-flanges at the mid-span points between supporting transverse I-beams. As the direction of the slots for the upper cross bars is alternated in adjacent tees, the insertion of the bars subjects them to a slight twist in alternate directions at the successive tees, which locks the upper cross bars rigidly in the stems of the tees without further fabrication.

This construction serves two functions. It provides a complete self-supporting formwork for the concrete with which it is filled, and the combination of the concrete and the steel frame produces a composite slab, the strength and stiffness of which has been established by both laboratory and service tests.

Details of the New Deck

Studies of the requirements for the use of this construction led to the adoption of a design involving the use of 3½-in. by 3½-in. tees weighing 5 lb. per ft., in combination with 1-in. by 3/16-in. bars spaced 4 in. center to center. The permissible span length under the loads imposed gave rise to a floor design in which the T-Tri-Lok spans longitudinally between 12-in. 40.8-lb. I-beams placed transversely across the top of the existing floor stringers of the bridge. The spacing of these I-beams was determined in part by the panel lengths of the bridge floor and varies from 40 to 42 in. This construction and a ballasted track with 8 in. of ballast under the ties weighs 5,400 lb. per foot of bridge, a load that does not produce excessive stresses in any part of the bridge under present or anticipated train loads.

The T-Tri-Lok construction occupies a width of 27 ft. ½ in., with sidewalks of Carnegie floor plates 2 ft. 10 in. wide on each side, stiffened by 6-in. by 3½-in.

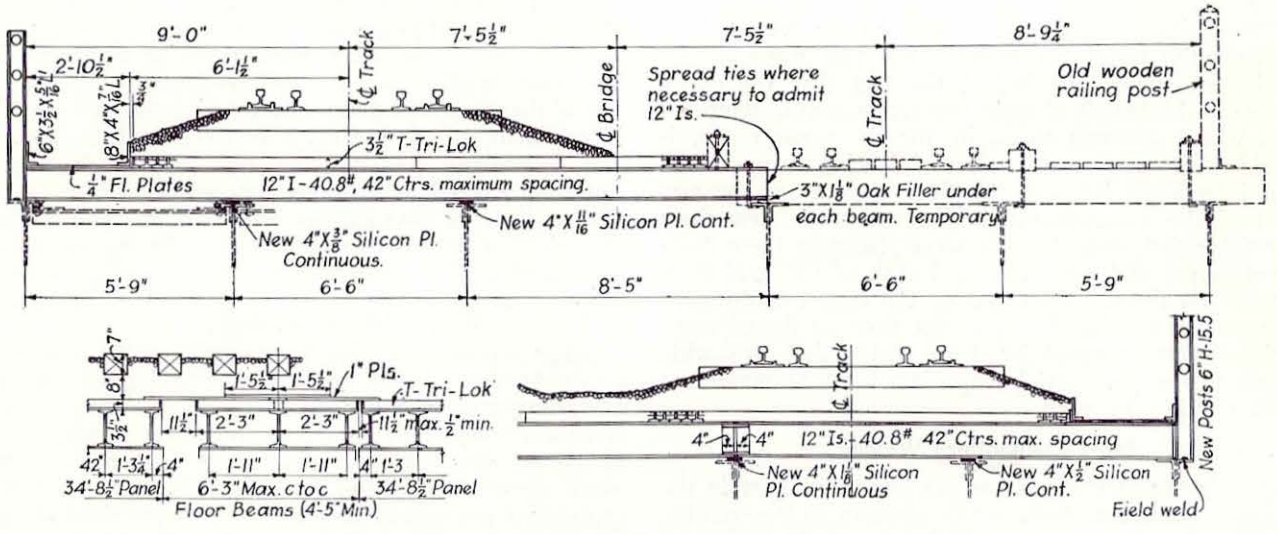


A General View of the T-Tri-Lok Before the Concrete was Placed

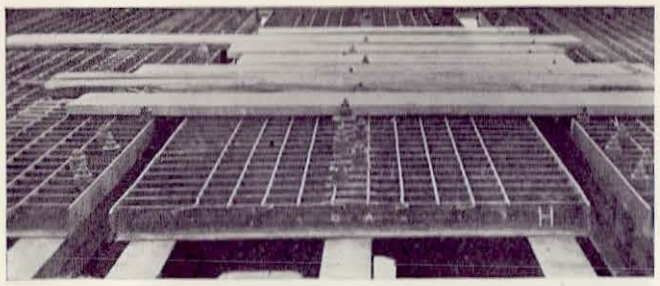
by 5/16-in. angles along the outer sides and by an 8-in. by 4-in. by 7/16-in. angle on the inside. The two inner angles function also as curbs for the ballast and are set ¾ in. clear of the edges of the T-Tri-Lok slab to provide slots for drainage. The old wooden posts were replaced by 6-in. 15.5-lb. steel H-sections punched to receive the original pipe rails.

The arrangement and method of supporting the I-beams on the stringers was determined by two considerations, (1) the desirability of sloping the deck for drainage, and (2) the necessity for applying the new construction to one side of the bridge at a time while the other side was left clear for trains. To provide drainage, the I-beams were sloped toward the two sides of the bridge by supporting them on continuous fillers of different thicknesses, laid on top of all the stringers except the two safety stringers, and to permit of the construction of the deck in two stages it was necessary to provide separate beams to support the deck under each track.

However, to avoid the objectionable conditions incident to independent cantilever action of beams meeting at the center line of the bridge, it was decided to provide beams for the first section to be installed that extended from the safety stringer next to the southbound track to the inside stringer for the northbound track. In other words, the I-beams for the first section of the floor to be installed, i.e., under the southbound track,



Details of the New Floor Construction, Showing First Stage Above and Second or Final Stage at the Lower Right. Details of Floor Over the Expansion Joint Shown at Lower Left



Manner of Applying the T-Tri-Lok Over the Expansion Joint

are 20 ft. 8 in. long, while those for the second section of the floor are only 12 ft. 3 in. long. As a consequence of this arrangement, the high point in the floor for drainage was necessarily at the point where these beams meet, or over the inside stringer of the northbound track. Accordingly, a filler plate 1⅛ in. thick was placed on the top flange of this stringer with thinner fillers on the other stringers, to provide a uniform slope to the two sides of the deck. To obviate the use of beveled filler plates, these plates were furnished in widths of only four inches, and to provide some increase in the strength of the top flanges of the stringers, the fillers were attached by continuous bead welds along both edges.

Special Features

The T-Tri-Lok was delivered in sections 4 ft. wide and having lengths that lacked ½ in. of equalling the panel lengths of the bridge, namely, 25 ft. to 37 ft. 1¾ in. The ends of these sections were finished with an edge plate so that the ½-in. gap, provided for expansion, could be filled with asphalt mastic. The edges of the sections, abutting on the curb angles were also finished with an edge bar of full depth, but on all of the intermediate edges of the sections, the cross bars were cut alternately short and long so as to interlock when adjacent sections were set in place.

Another noteworthy detail of the construction was the method employed to increase the section modulus of the slab for negative moment over the supporting beams, to compensate for loss of section resulting from the notches in the stems of the tees. As shown in one of the illustrations, notches were cut in the two cross bars directly over the beam and rods 7/16 in. in dia. and 20 in. long were pressed into these notches, with their ends bent down so as to pass under the bars on either side of the notched bars.

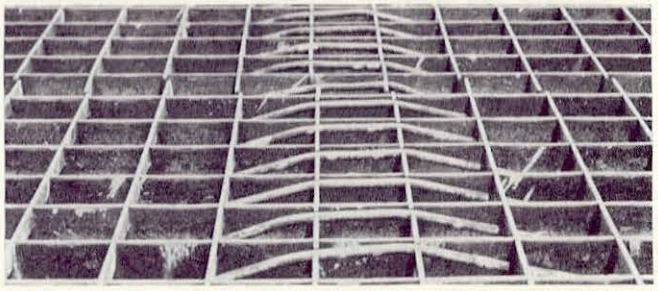
Special construction was necessary over the pier that supports the adjoining ends of the two units of the continuous spans. Owing to the fact that the entire change in the length of these two spans, due to temperature, which amounts to 22 in. for the usual range, is provided for at this point, a set of floating stringers had been introduced between the floor systems of the two units of the superstructure. To carry the new floor over this point, three I-beams were placed on these floating stringers and a 4-ft. 6 in. length of the grid floor installed on them. After placing the concrete, the gaps between this floating floor and the floor on the adjacent sections were covered by 1-in. plates that are wide enough to span two variable openings having a maximum width of 11½ in. each.

Most Connections Welded

Electric arc welding played an important part in the erection of the new deck, for in addition to the welding of the filler plates to the top flanges of the stringers, previously mentioned, resort was had to welding in making practically all of the connections required. The only important exception was the use of bolts for connecting the railing posts to the sidewalk curb angles. The largest amount of welding was required for attaching the floor sections to the supporting I-beams, which was done by plug-welding through slotted holes, 2-in. by ⅜ in., punched through the flanges of the tees at every third joint between tees over every beam. Hook bolts engaging the top flanges of the I-beams were employed to draw the sections down to a solid contact with the beams while the welding was in progress. This work required the service of six welders, served by six portable welding outfits, and the application of 6½ tons of welding rod.

All of the welded connections were laid out in such a way as to provide down-hand welding, not involving the use of scaffolds, except the welding of splice bars on the under side of the top flanges of the I-beams. Both the top and bottom flanges of the beams were connected by splice bars, 2¾ in. by 9/16 in. and 2 in. by ¾ in., respectively, where the sections for the southbound and northbound tracks came together, for the purpose of developing the beams in negative moment over the supporting stringer at that point.

A collateral advantage of the T-Tri-Lok floor that proved of special benefit in the work on this bridge was its availability as a floor for the conduct of construction



How the T-Tri-Lok Was Reinforced for Negative Moment Over the Beams

operations as soon as it was laid, not only for the welding but also for the concreting, including the delivery of the concrete in a 1½-ton truck, as shown in one of the illustrations.

Concrete of High Quality

Special pains were taken to produce concrete of high quality, not only to permit of high unit stresses in the slab, but also to insure a high degree of impermeability as it was desired to avoid the use of waterproofing. For the purpose of test, only, three types of waterproofing have been applied to three different panels, but all the rest of the deck is in direct contact with the ballast. The approximate concrete proportions were 1—1½—2½, the real controlling factor being that the mixing water could not exceed five gallons per sack of cement. Actually, as little as four gallons was used in some batches, and concrete with a slump of only 0.75 in. was placed successfully. The strengths developed in 6-in. by 12-in. cylinders amounted to as much as 2,580 lb. per sq. in. in 3 days and 5,589 lb. in 28 days.

Other precautions taken to insure good concrete were a mixing time of 2½ min., the sprinkling of the steel work during hot weather to avoid excessive temperatures, and the curing of the concrete under wet tarpaulins for 72 hours after placing. To insure that the concrete would completely fill the T-Tri-Lok, it was vibrated by applying a pneumatic jack hammer to the steel grid as the concrete was being placed.

The concrete for the west section was mixed in a

plant alongside the tracks beyond the south end of the bridge and delivered to the bridge floor in a truck, as previously mentioned, the concreting being started at the north end of the structure and progressing southward. The truck, which was equipped with a tail dump box, was backed out on the bridge with its load and ran forward in the return direction. The concrete was dumped on a wooden pan from which it was shoveled onto the grid work. The surface was struck off flush with the top of the grid with a trowel and screed.

In concreting the east section, the sand, stone and cement were batched south of the bridge, the batches being delivered in motor trucks to the mixer which was placed on the bridge so that the concrete could be discharged directly on the shoveling pan. The concreting was started, as before, at the north end of the bridge, the mixer being moved south as the work progressed. This arrangement proved more satisfactory than mixing the concrete off the bridge. As much as 600 ft. of the floor (for one track) was concreted in one day.

The progress of the work is indicated as follows:

Work authorized	April 19
Temporary track work and connections completed and the bridge put under single-track operation (northbound track) to permit construction work to proceed on the southbound track	May 7
Construction work on the floor for the southbound track started	May 7
Steel for the southbound track completed, cleaned and ready for concreting	July 3
Concreting for T-Tri-Lok started	July 5
Concreting for T-Tri-Lok finished on the southbound track	July 12
Southbound track placed in operation and northbound put out of service for construction purposes	July 25
Construction work on the northbound track started	July 30
Steel on the northbound track completed, cleaned, and ready for concreting	September 21
Concreting for T-Tri-Lok started	September 22
Concreting for T-Tri-Lok finished on the northbound track	September 26
Northbound track placed in operation, providing double-track operation on the new floor	October 5

Install GEO Track

The track on the bridge was relaid with 131-lb. rail with GEO fastenings, the single deviation from GEO practice in previous installations being the use of rubber shims $\frac{5}{32}$-in. thick in place of pressed-wood shims under about half of the tie plates. The guard rails are of 130-lb. relayer rail.

The new floor involved the use of 631 tons of structural steel, 709 tons of T-Tri-Lok floor, 75 tons of sidewalk floor plates and 574 cu. yd. of concrete. The American Bridge Company furnished and erected all of the steel work, employing a force of about 20 men, a foreman and a timekeeper; and the Harrison Construction Company, Pittsburgh, Pa., placed the concrete, with a force of about 28 men and a foreman. The entire project was under the direction of F. R. Layng, chief engineer of the Bessemer & Lake Erie, Greenville, Pa.

The Concrete Placing and Finishing Gang—Note Man with Jack Hammer at the Right

Eastman Finds Railroads Slow to Co-operate

DECLARING that the need of the railroads is "to improve and cheapen their product at one and the same time," which he admitted "sounds like a hard nut to crack," and that they will not crack it "without organization and co-operation," Co-ordinator Eastman, in an address before the Hartford, Conn., Chamber of Commerce on February 7, said he had not yet seen as much evidence as he would wish that the railroad executives "are prepared to deal adequately with the phases of railroad operation which cry for collective handling on broad lines and the subordination of individual managements."

"Many industries in this ordinary competitive world have cracked similar nuts when brought squarely up against necessity," he said, but he expressed the opinion that the railroads are "in danger of passing up opportunities to strengthen and sustain and improve the present railroad set-up, and with possible results which they may not anticipate," and that railroad labor is "subject to a similar danger." Mr. Eastman also took occasion to emphasize the reasons for his proposal that the Interstate Commerce Commission be reorganized for the task of regulating all forms of transportation, along lines as to which the commission does not agree with him. Mr. Eastman said in part:

A.A.R. Has Great Authority "On Paper at Least"

The railroads have made a forward step in this direction by the organization of their new Association of American Railroads. It has been given, on paper at least, much greater authority over matters of common concern than has hitherto been granted to any central railroad organization, and under the leadership of a man whom you all know well—Mr. Pelley, former president of the New Haven railroad—it is building up what are designed to be strong departments for the consideration of these matters. I believe that it will serve a very useful purpose and look forward to many excellent results. Particularly I hope and expect that it will be successful in creating a department well manned and equipped for scientific research, in behalf of all the carriers, big and small, into the mechanics of railroading.

But while I welcome and applaud the creation of this new railroad association, I would not be candid if I did not say that it remains to be seen whether the railroad executives will rise to the occasion as their own interest and the public interest demand. Some time ago I transmitted to them a study of merchandise traffic. The railroads have for some years been losing out on this traffic. The facts show that it is handled in a most wasteful and expensive way and at a financial loss, that the service is unsatisfactory to shippers in many respects, and that the present rate structure is unsuited to modern conditions. We submitted a definite plan for the cure of these evils, but it called for nationwide collective action on the part of all the railroads. They admit the evils but have rejected the plan for reasons which have not been made clear, at least to me. They say that they propose to eliminate the evils in other ways, but no definite proposals have yet been brought to my attention.

Doubts Favorable Action on Car Pooling

I have also transmitted to them a plan for the pooling of box cars, as a first step toward the pooling of freight equip-

ment generally. The collective ownership and administration of these jointly-used tools of the trade would have manifest advantages. Not only is it the best means of reducing unnecessary empty-car mileage and securing maximum use from the cars, but it would promote economy in repairs and the reasonable standardization of equipment, and also facilitate the financing of car purchases. The logic of the facts points straight toward a car pool. The response by the executives to this plan is yet to come. I hope it will be favorable, but I have my doubts, because a car pool touches the point where the executives are most sensitive. They do not respond readily to any proposal which involves an important surrender of authority upon the part of the individual managements, and even less readily if the proposal has a nationwide aspect.

These are illustrations only. In my contact with the railroad executives these tendencies have made their appearance time and again. I venture this comment in no spirit of hostility or complaint. If I were in their place, I should probably react in the same way. They are striving earnestly to do their duty as they see it. They may be right and I may be wrong. But if I am right, they are in danger of passing up opportunities to strengthen and sustain and improve the present railroad set-up, and with possible results which they may not anticipate.

Railroad labor is subject to a similar danger. If the very considerable waste which now exists in railroad operation were eliminated, it might mean a corresponding reduction in employment. If it were done gradually upon a rising tide of business, the displacement would be minimized; but such favorable conditions may not develop. To protect labor against unjust hardships, I am recommending a plan of dismissal compensation in connection with co-ordination projects. The railroads would gain the benefit of a part of the economies at once and eventually of all.

The employees have been urging such a scheme for some years. They welcome the recognition of the principle, and they indicate that if these were prosperous times all might be well. Unfortunately, they suggest, these are not prosperous times, and under present conditions dismissal compensation may only defer starvation or a place on the relief roll. They ask for work and not for relief.

Labor's Last Condition Will Be Worse Than Its First If It Blocks Economy

No thinking man can fail to be sympathetic with this attitude. The answer lies in the general improvement of business conditions. But looking at the situation from the standpoint of the railroads alone, it must be evident that they are faced, not only with the depression, but with an eruption of widespread and serious competition. As I have already indicated, the one way to meet that competition is to cheapen and improve their product, which is their service, at one and the same time. As a matter of practical wisdom, if railroad labor stands in the way of such a program, its last condition will be worse than its first. On the other hand, if it co-operates, the door to an ultimate increase in railroad employment will be open.

So far I have confined my remarks quite largely to the railroads, but the fact is, of course, that the real problem before the country is a transportation problem and not a railroad problem alone. One question is whether any of these agencies are unduly favored by government, federal, state, or municipal, so that virtual subsidies exist which make the conditions of competition unfair. My staff has been trying its level best to get all the available facts on that matter. It has proven to be a stupendous task. To be on the safe side we have submitted tentative drafts of the report to interested parties with technical knowledge, for their study and criticism. I am led to believe that we are on the right track, for no one of the partisans is satisfied, and as a result of much experience I am prepared to say that such well-distributed dissatisfaction is a favorable sign.

Apart from that question, the thing that we all must want is a stable, dependable, and financially sound system of national transportation which will utilize all these agencies of transportation to the best advantage and reduce the amount of unnecessary and wasteful duplication or competition which has no real economic value but instead threatens the integrity of the entire structure. As one important step toward that end I recommended in my recent report that all the important forms of transportation be brought under the same degree of regulation by the federal government and by a single centralized agency which can deal with them all equally and impartially without any conflict of policies.

Why I.C.C. Reorganization Is Desirable

Most of my colleagues on the Interstate Commerce Commission, for whom I have the utmost respect, differ from me on one point. We agree that the commission should be the single agency for the regulation of the various forms of transportation; but I think that its organization should be adjusted by law for this purpose, while they do not, or at least they feel that all matters of internal organization should be left to the judgment and discretion of the commission. I regret this difference of opinion, for otherwise we stand together, but on this single point we found it impossible to reconcile our views. I shall not try to state their case, for I might not do it justice. All that I shall try to do is to give you briefly the grounds on which my view of the matter is based.

One of the sound criticisms of public regulation of railroads and public utilities, as it has been practiced in this country, is the time it takes. It has been characterized too often by prolonged litigation of issues and by ponderous and burdensome procedure. I see no escape from much of this. It is inherent in the system and one of the reasons why my thought has inclined toward public ownership and operation. All interested parties must be given opportunity to be heard; the facts must be developed in an open, public record; the regulating authority must state the reasons for its decisions; and the courts must have an opportunity to review all questions of law. But within these limits there is much that can be done to curtail and simplify procedure and to promote the expedition which is so much to be desired; and regulation, if it is to be successful, must also be based upon a keen and thorough understanding of the industry to be regulated.

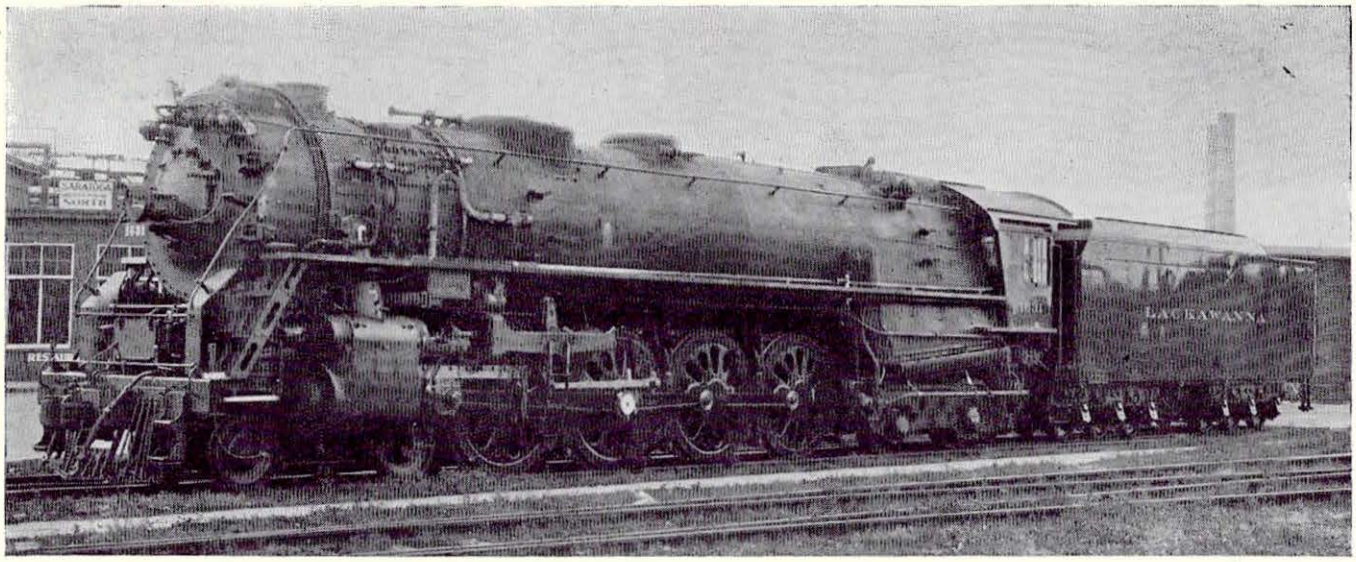
My own conviction is that the commission cannot do this job as well as it should be done without a rather radical readjustment of its organization. I propose an organization which would give each form of transportation a division of the commission to concentrate and specialize on its problems and yet bring these divisions under a common control which will prevent conflict and inconsistency in policies. I propose a permanent chairman who can devote the necessary time to the improvement of procedure and promote the expeditious and efficient conduct of business. I propose an organization which will also permit more personal attention by commissioners to the matters which come before the commission but at the same time make it a less unwieldy and more flexible institution. These are the objectives at which the plan is directed.

It embraces one other feature which I believe to be important. In view of the present confused and complicated transportation situation, the developments which are in the making, and the speed with which the picture changes, it is highly important that an agency of the government should be in close contact with the situation, study it intensively, and be in a position to help in guiding and shaping developments in the general public interest. The discussion of this subject is somewhat embarrassing to me, for the work and activity on the part of the government which I have in mind is very much the sort of thing which I have been undertaking to do as Federal Co-ordinator of Transportation. However, it is my duty to recommend what I think should be done.

Permanent Co-ordinator Can Be of Much Value

The job of Federal Co-ordinator of Transportation comes to an end under the present law on June 16, 1935. I am proposing that a permanent Co-ordinator of Transportation, linked with the commission, be established, and given duties extending, not only over the railroads, but over the entire field of transportation. It is my conviction that such an agency of government can be of much value, not only to the carriers, but to the country, and that only the government can do such work impartially and effectively.

Let me in concluding say that I am not pessimistic either as to the railroad situation or as to the transportation situation generally. It will take only a small lift in general business to make the prospects look much better than they superficially appear at the present time, and the forces of enterprise and initiative are beginning to swing into action.



Delaware, Lackawanna & Western 4-8-4 Type Locomotive Built by American Locomotive Company

Lackawanna Receives Twenty More 4-8-4 Type Locomotives

New power designed to handle either fast freight or heavy passenger traffic

THE latest addition to the motive-power equipment of the Delaware, Lackawanna & Western consists of 20 locomotives of the 4-8-4 type built by the American Locomotive Company at the Schenectady plant in accordance with designs and specifications developed and furnished by the railroad company. These locomotives can best be described as double-purpose engines and will be allocated either to heavy passenger or fast-freight service, operating between Hoboken, N. J., and Buffalo, N. Y., as traffic conditions require. Upon completion of delivery of this order the road will have a total of 55 locomotives of the same general type, all of which have been built by the American Locomotive Company.

The first locomotives of the 4-8-4 type acquired by the Lackawanna were received in 1927 and were designed to handle heavy passenger trains. They were numbered from 1501 to 1505, had 27-in. by 32-in. cylinders, 77-in. drivers, carried 250 lb. steam pressure, weighed 421,000 lb., and had a rated tractive force of 64,500 lb. A description of these locomotives was given in the *Railway Age*, December 3, 1927.

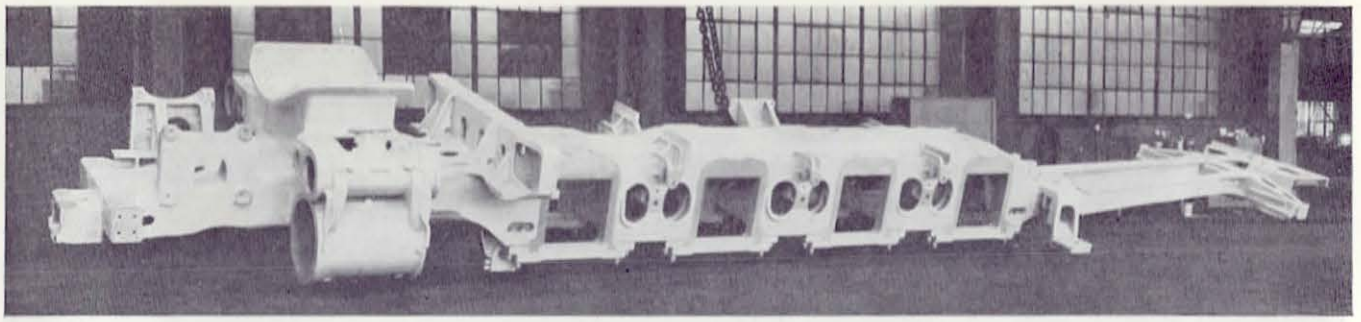
The next lot of 20 4-8-4 type locomotives, numbered from 1601 to 1620, was designed for heavy fast freight service and was received in 1929. They had 28-in. by 32-in. cylinders, 70-in. drivers, carried 235 lb. steam pressure, weighed 418,000 lb., and had a rated tractive force of 71,600 lb. A third lot, 10 locomotives, numbered from 1621 to 1630, was delivered in 1932. They were of the same general design as the previous lot, but contained several improvements in design, including Type E in place of Type A superheaters, and were somewhat heavier, their weight having been increased to 429,000 lb.

New Locomotives Designed To Handle Either Passenger or Freight Trains

The locomotives now being delivered are numbered from 1631 to 1650 and, as stated, are intended for handling either passenger or fast freight traffic. Comparing these with the previous ones numbered in the 1600 series, it will be noted from an accompanying table that by an increase in steam pressure from 235 lb. to 250 lb. the tractive force has been maintained with the same size cylinders despite the increase in diameter of the driving wheels from 70 in. to 74 in. The suitability of a properly designed 4-8-4 locomotive for handling both modern fast freight and heavy passenger trains is making the type a closer approach to a general purpose locomotive than any other type that followed the old American, or 4-4-0, type which 60 years ago was practically the universally used wheel arrangement on road engines.

The Lackawanna, in designing these new locomotives, has followed its customary practice of making detail parts as far as possible the same as on previous locomotives, but this practice was not permitted to interfere with the inclusion of improvements when they could be made with assured advantage.

Clearance and weight limitations restricted the height to 15 ft. 4 in., the width to 11 ft., and the weight per driving axle to 68,500 lb. With 28-in. by 32-in. cylinders, 250 lb. steam pressure and 74-in. driving wheels,



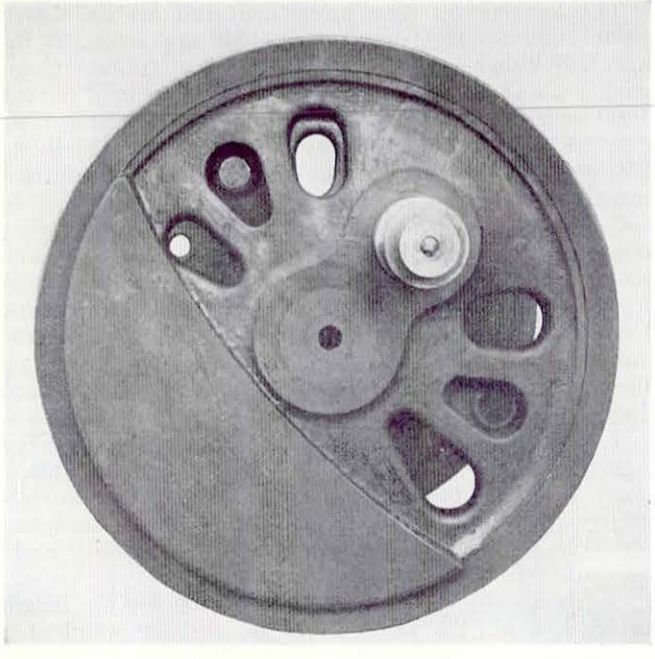
The Locomotive Bed for D. L. & W. 4-8-4 Type Locomotives

the locomotives develop a rated tractive force of 72,000 lb. A booster has not been applied to the trailing truck, but provision has been made in the design for its application at some future time should its addition be found advisable. The total weight of these locomotives is 447,000 lb., of which 274,000 lb. is on the driving wheels, 79,500 lb. on the leading engine truck, and 93,500 lb. on the trailing truck—45,000 lb. on the front axle and 48,500 lb. on the rear axle. The combined length of the locomotive and tender is 90 ft. 8½ in.

Foundation and Running Gear

The locomotive is built on a cast-steel bed furnished by the General Steel Castings Corporation which follows current general practice and includes cradle and cylinders with integral back heads. The main air reservoir is made a part of the bed casting for the first time on a Lackawanna locomotive. In addition to the usual brackets, including those for the air compressors at the front deck, an integral bracket has been added for the power reverse gear. The incorporation of the main reservoir and the support for the Alco Type G1 reverse g[illegible] as a part of the bed casting has made possible the elimination of a considerable number of attachment studs in the boiler shell. By care in designing the shipping weight of the locomotive bed has been kept down to approximately 68,900 lb.

The Boxpok double-disc driving wheels are of a new design, in the development of which the American Locomotive Company and the General Steel Castings Corporation collaborated.



Boxpok Double-Disc Driving Wheel

The driving axles and the main crank pins are of the hollow composite type developed on the Lackawanna. A description and drawings of axles and pins of this type was given in the 1934 report of the A.R.A. Committee on Locomotive Construction. Another innovation is the introduction of a snubber spring of the coil type at the bottom of the rear trailer spring hanger. This was adopted in order to improve, if possible, the vertical riding qualities of the engine. The driving springs are of the reverse camber type.

Comparison of Lackawanna 4-8-4 Type Locomotives

Road Nos.	1501 to 1505	1601 to 1620	1621 to 1630	1631 to 1650
Date	1927	1929	1932	1934
Tractive force, lb.	64,500	71,600	71,600	72,000
Weight of engine, lb.	421,000	418,000	429,000	447,000
Weight of drivers, lb.	269,000	262,000	271,000	274,000
Cylinders, in.	27 by 32	28 by 32	28 by 32	28 by 32
Drivers, diam., in.	77	70	70	74
Steam pressure, lb.	250	235	235	250
Heat. surface, firebox, total, sq. ft.	493	515	511	496
Heat. surface, tubes and flues, sq ft.	4,700	4,621	4,934	4,992
Tube length, ft.-in.	21-6	21-6	21-6	21-6
Superheat surface, sq. ft.	1,324	1,324	2,243	2,180
Grate area, sq. ft.	88.2	88.2	88.2	88.2
Superheater, type	A	A	E	E
Tender, water, gal.	12,000	15,000	15,000	16,000
Tender, coal, tons	14	22	22	26

The valve gear is of the Walschaert type and operates 12-in. piston valves with 7½-in. travel. The crossheads and guides are of the multiple-ledge Laird suspended type. The throttle is of the American multiple-valve design.

All Locomotive Axles Have Roller Bearings

A feature of especial interest is the fact that all 20 locomotives are equipped throughout—engine trucks, driving axles and trailer trucks—with roller bearings. The first 18 have Timken bearings and the last two, SKF bearings. The decision to use roller bearings was based on previous experience with two engines fitted with Timken bearings which have operated satisfactorily for upwards of 225,000 miles.

The boiler, which is of conventional design, is of liberal proportions in order to provide ample generating capacity to sustain a maximum of 4,025 potential horsepower over long continued periods. The inside diameter at the first course is 84¼ in. The firebox is 132 in. by 96½ in. inside, which gives a grate area of 88.2 sq. ft. The grates are of the Firebar type. Bituminous coal is used as fuel and is fed by a B-K Standard automatic stoker. Two Nicholson thermic syphons and three arch tubes are fitted in the firebox and one additional syphon in the combustion chamber which is 66 1/16 in. long. There are 82 tubes, 2¼ in. in diameter, and 202 flues, 3½ in. in diameter, 21 ft. 6 in. long. This gives a heating sur-

face of 496 sq. ft. in the firebox and combustion chamber and 4,992 sq. ft. in the tubes and flues, or a total of 5,488 sq. ft. evaporative heating surface.

The superheater is an Elesco Type E with 2,180 sq. ft. of surface and is of a capacity to deliver the required amount of steam at a final temperature of between 700 and 750 deg. F. Worthington feedwater heaters are applied on the first 18 locomotives and Elesco exhaust-steam injectors on the last two locomotives. Superior

Principal Dimensions and Weights of the D. L. & W. 4-8-4 Type Locomotives

Railroad	D. L. & W.
Builder	American Locomotive Co.
Type of locomotive	4-8-4
Road Nos.	1631—1650
Service	Freight and passenger
Rated tractive force	72,000 lb.
Cylinders, diameter and stroke	2—28 in. by 32 in.
Valve gear, type	Walschaert
Valves, piston type:	
Size	12 in.
Maximum travel	7½ in.
Weights in working order:	
On drivers	274,000 lb.
On front truck	79,500 lb.
On trailing truck	{ 45,000 lb. F. } 48,500 lb. R.
Total engine	447,000 lb.
Tender	313,000 lb.
Wheel bases:	
Driving	19 ft. 6 in.
Rigid	19 ft. 6 in.
Total engine	41 ft. 6 in.
Total engine and tender	86 ft. 8½ in.
Wheels, diameter outside tires:	
Driving	74 in.
Front truck	33 in.
Trailing truck	{ 36 in. F. } 44 in. B.
Boiler:	
Type	Conical con.
Steam pressure	250 lb.
Fuel	Soft coal
Diameter, first ring, inside	84¼ in.
Firebox, length and width	132 in. by 96¼ in.
Arch tubes, number and diameter	3—4 in.
Combustion chamber, length	66 1/16 in.
Tubes, number and diameter	82—2¼ in.
Flues, number and diameter	202—3½ in.
Length over tube sheets	21 ft. 6 in.
Grate type	Firebar
Grate area	88.2 sq. ft.
Heating surfaces:	
Firebox and combustion chamber	374 sq. ft.
Arch tubes	27 sq. ft.
Syphons	95 sq. ft.
Firebox, total	496 sq. ft.
Tubes and flues	4,992 sq. ft.
Total evaporative	5,488 sq. ft.
Superheating	2,180 sq. ft.
Combined evaporative and superheating	7,668 sq. ft.
Special equipment:	
Superheater	Elesco, Type E
Feedwater heater (18)	Worthington
Exhaust steam injector (2)	Elesco
Stoker	Standard BK
Tender:	
Style	Rectangular W. B.
Water capacity	16,000 gal.
Fuel capacity	26 tons

flue blowers, Barco low water alarms, Huron washout and arch tube plugs and Franklin Butterfly firedoors are included as part of the equipment.

On the left-hand side of the cab is a special seat for the use of both the fireman and the head brakeman. As an assistance to safe and economic operation automatic three-light cab signals, made by the Union Switch & Signal Company, are located within convenient range of both the engineman and the fireman. This system provides both visible and audible cab-signal indications.

The air-brake system is the new Westinghouse 8-ET form with brake valves and associated parts pedestal mounted. Two 8½-in. cross-compound air compressors are included. Heretofore, this road has found 11-in. air compressors of sufficient capacity for their requirements.

The tender is of the rectangular type, having a capacity for 16,000 gal. of water and 26 tons of coal, although 28 tons may be loaded by heaping. The loaded weight is 313,000 lb. The tank is mounted on a General Steel Castings Corporation water-bottom underframe weighing 31,000 lb. It is carried by six-wheel trucks of General Steel Castings design. Brake rigging is of the clasp type furnished by the American Steel Foundries.

In appearance these locomotives have an unusually clean and smooth appearance, both above and below the long straight running board, which reflects great care in designing and will serve to reduce wind resistance and thus increase efficiency.

One of the tables shows a comparison between the several lots of Pocono type locomotives ordered at different times by the Lackawanna, while another table gives the more important weights and dimensions of these locomotives.

Advantages of Pooling Box Cars*

By Olin C. Castle†

I SHALL touch on only a few of the questions which have been raised in the recent study of our plan. This should serve to illustrate my point that there is nothing unsound or impracticable in the suggestion that the principles which are today applied successfully in the maintenance and distribution of cars on a single large system or in the co-ordinated operation of large groups of refrigerator cars, may be extended with advantage to include all of the box cars now operating in interchange on a nation-wide basis.

In discussing this subject with shippers I find that the question which is uppermost in their minds is that of maintenance. With box cars pooled, and with a large proportion presumably away from owners' rails, how, they ask, will a road protect its requirements for high-grade cars where the traffic demands a large ratio of such equipment?

The obvious answer to this is that under a practical operation it will be taken care of exactly as it is today. The balance between high-grade box cars and rough loaders is in a state of continual disturbance. This is true with respect not only to local loading but also to interchange traffic.

Such a condition can be met only by the regulation of car repairs to take care of current requirements. If the demands of loading or the inequality of interchange lower the ratio of high-grade cars, the maintenance program must provide for repairing or raising the classification of enough cars to maintain the condition ratio.

In the pool equalization, originating railroads will normally receive in return movement, either loaded or empty, a substantial proportion of their own cars or cars of similar character belonging to roads in the same general territory. Not all of the cars so received will be in the same condition as when delivered. Nor are they under present rules. Each road's repair program must provide for restoring to condition a sufficient proportion to meet loading requirements. The only difference is that today the originator of high-grade commodities bears the burden of his better maintenance, for the partial benefit of the connections to which he delivers his cars, which connections apply them to their own high-

* From an address before the New York Railroad Club, January 18, 1935.

† Director, Section of Car Pooling Federal Co-ordinator of Transportation.

grade loading, or all too often lower their condition by returning them under load with lower grade freight. Under a pool the general maintenance is apportioned on the basis of usage, with a further protection in the requirement that the road which, by improper use, lowers the classification of a car, must restore it at its own expense.

Maintenance Expenses

Related to this question is the fear expressed by some questioners that maintenance expenses will be unduly increased if cars in general are kept in a condition to meet the needs of roads which originate high-grade commodities. This anxiety can be justified only on the assumption that the railroads and the pool management will apply principles entirely different from those which govern the regulation of maintenance on a single railroad system. Certainly no practical person would propose that all box cars in the country or even all box cars on a single railroad should be maintained in class A condition. As previously explained, it is the intention that each road shall control this feature in much the same manner as it is controlled today.

Under the pool plan the urge is toward a higher standard of maintenance, because the natural disposition of member roads will be to apply to the cars on their own rails at least as much maintenance expense as they assume in their pro rata share of the total pool maintenance which is charged out on the basis of car mileage. Any over-zealous desire to exceed what is necessary would be curbed by the authority of the pool to regulate maintenance expense. Again we must rely upon a practical exercise of this authority. There are no greater difficulties involved in the regulation of this feature than present themselves in the planning of repair programs and the budgetting of shops on any large railroad system.

Control Over Maintenance Budgets

Some commentators have raised the objection that the assumption and proration of repair costs by the pool deprives the member roads of any control over their maintenance budgets. In a measure this is true, but it is by no means as serious as it has been made to appear. Each road's share of the total repair costs will be governed by its car mileage, which in turn is generally related to revenues. Admittedly, the orderly and systematic control of car repairs from the standpoint of the national supply and demand will deprive individual railroads of the opportunity to shrink repair expenditures drastically to meet an emergency.

It is fair to assume, however, that a practical pool management will meet the situation in much the same way as it is now met on an individual railroad, especially since the pool organization includes a Board of Control consisting of active railroad officers in close touch with conditions in their respective regions.

The proposed method differs from the present in that such maintenance expense as is incurred will be currently borne by the roads that use the cars. This may not be looked upon with favor by those roads which defer their own repairs and depend, for their car supply, upon their more prosperous or provident connections.

Effect of Per Diem Charges

Our plan has also been criticized on the ground that the retention of the per diem element is inconsistent with the intent to eliminate the "per diem urge" and thereby reduce empty crosshaul movements. It is true that the incentive to escape per diem charges will still assert itself, although the per diem charge will be only about one-third of the present rate, since it applies only to the so-called "fixed costs" of ownership. With the home route of the individual car eliminated, the urge cannot result in the uncontrolled crosshauling of cars. It will assert itself in efforts to increase car efficiency and to create surpluses which may be tendered to the pool management for disposition or relief. In keeping with the principle that each road is obligated to assume responsibility for holding a number of cars equal to its ownership, any road having on line cars in excess of its ownership for which it has no need, may demand relief from the excess. If conditions do not warrant physical relocation, the pool manager may constructively relocate all or a portion of the excess by authorizing storage of a specified number of cars and relieving the holding road of the per diem expense on such cars. The amount so credited to excess roads will be charged to roads having on line fewer cars than they own, in proportion to their deficits.

The effect on the per diem balance will be the same as if the cars were actually relocated, but wasteful empty movements will be avoided and the expense of such movements will be saved.

Advantages of Car Pool

The reduction of empty car mileage, while of considerable importance, is only one of several conditions which offer opportunities for improvement in service and reduction in transportation costs attainable only by a co-ordination of freight car operation. Among the other possibilities are:

(a) Increased flexibility in the general car supply. The advantage of pooling in providing maximum availability with a minimum number of cars is demonstrated in the experience of existing refrigerator car pools, consolidated railroad system, and private tank car operations.

(b) Stabilization of car building, with a consequent reduction in first cost of equipment. Co-ordinated operation of cars under a central direction is essential to the attainment of this objective.

(c) Progress in standardization of equipment. Association activities limited to recommendations, over a period of more than forty years, have proved ineffectual.

(d) Improvement in shop practices generally and the utilization of the most economical and efficient shops is an essential part of a long-range pool program.

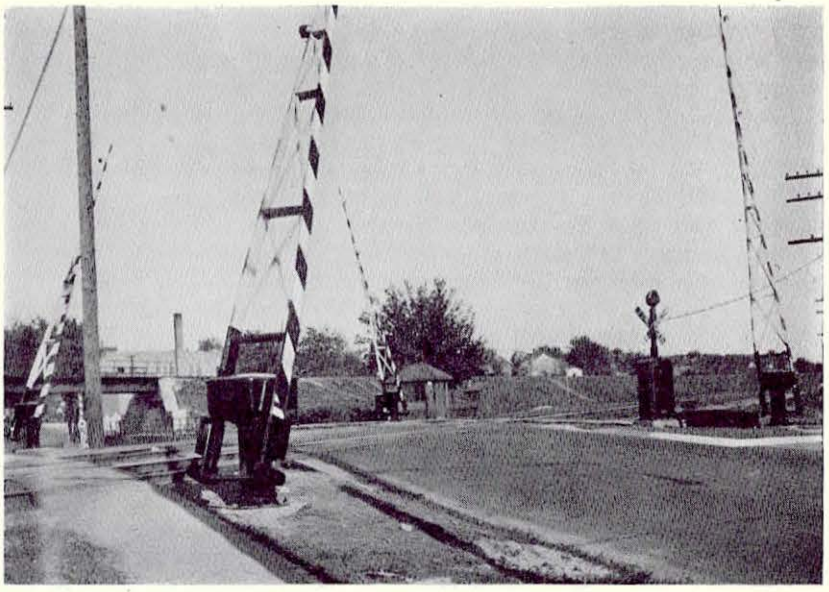
Expense of Operating Car Pool

Now a final word respecting the expense of operating a car pool such as we have proposed. So far as the pool organization is concerned, there should be little or no additional expense. Various estimates have been made of the cost of additional reports and accounting which would be imposed on the individual railroads in connection with pool operation. Such estimates as I have seen are unreliable because they assume the necessity of reports which a practical operation would not require, and because they ignore the savings possible in the centralization of certain accounting operations and the application of modern office methods which such centralization will make possible.

Certainly with the savings possible by reforms in car handling, the objection to a relatively insignificant accounting expense is not worthy of serious consideration. The cook does not hesitate to break a few egg shells when he wants to make an omelet.

Automatic Crossing Gates on the I. C.

Electrically-operated gates replace flagmen and manually-controlled gates — Savings range from 45 to 49 per cent



Four 25-Ft. Gates at Rockford, Ill.

THE Illinois Central has installed, at two heavily-traveled street crossings, gates that are operated electrically and that are controlled automatically by track circuits. At East Dubuque, Ill., the new equipment replaces manually-operated gates, while at Rockford, Ill., flagmen were employed at the crossing now equipped with the new gates.

At East Dubuque, the main street, which also carries through highway traffic, crosses the single-track main line just west of the station. Several factors contribute to making this a hazardous crossing. The highway traffic is very heavy, especially during the summer months, as this is the main route leading to a bridge over the Mississippi river. Also, the view of approaching trains is cut off from the east by buildings, while from the west the track approaches the crossing through a tunnel, the end of which is only about 50 ft. from the crossing. The traffic over this line includes 6 passenger and 17 freight trains of the Illinois Central, 4 passenger and 12 freight trains of the Chicago Great Western, and about 6 switching runs of the Chicago, Burlington & Quincy, making a total of about 45 train movements daily, in addition to several switching movements by the I. C.

Under the previous arrangement, this crossing was protected by manually operated pneumatic gates, one man being on duty each trick. As these gates were in need of replacement, it was decided to install electrically-operated gates controlled automatically by track circuits, thus making it possible to effect an annual saving in operating expenses which represents a return of about 49 per cent on the gross expenditure for the new gate installation.

Features of the Gate Operation

On account of the tracks crossing the street at an angle and because a side street comes in on the crossing, the gates span an opening of 77 ft. on one side and 70 ft. on the other. The lengths of the gate arms vary from 35 ft. to 40 ft. Spaced about six feet apart along the top of each gate arm are three lamp units, each consisting of a 50-watt, 110-volt red lamp with a sheet metal shield over the top. These lamps are lighted constantly at night and, when the gates are lowered, form a row of red lights across the highway.

As train speeds are limited through East Dubuque, the westbound approach track circuit is only 967 ft. long and the eastbound circuit is 1,021 ft. long. A separate track circuit 112 ft. long extends over the crossing. The gates cannot clear until the short circuit over the crossing is unoccupied, and yet they will clear as soon as the rear of a train leaves this short track circuit. In case cars are to be left standing on one of the approach circuits for a considerable time, the gates can be controlled by push buttons, one set of which is located on the operator's desk in the station window, about 200 ft. from the crossing, while another set is mounted on the outside wall of the station building.

When a train enters a track circuit, about three seconds elapse before the gate starts, and then it is lowered to the down position in about 13 seconds, thus requiring about 16 seconds from the time the operation starts until the gates close the highway. An interesting feature is that the two gates on the side from which the train is approaching start down about four seconds before those on the leaving side. The purpose of this arrangement is to give time for an automobile or truck to get off the crossing in the event that it passes just as the gates are being lowered.

After a train passes off the crossing, about three seconds elapse before the gates start to move, after which they are raised in 5½ seconds. This difference in the time required to lower and raise the gate is of advantage in two ways. By lowering the gate slowly, a warning is given to approaching cars to give drivers a chance to stop. On the other hand, when a train has cleared the crossing, it is an advantage to clear the crossing for the highway vehicular traffic as soon as possible.

As the highway approaching this crossing from the

west is on a descending grade and at an angle, the situation is especially hazardous. Therefore, in order to give an approach warning, a flashing-light signal is mounted at the right of the highway. This signal is controlled by the approach track circuits and starts to operate about three seconds before the gates start to lower. Also, attached to this signal mast is a STOP sign which is normally dark but is illuminated when the signal operates. A similar STOP sign is located at the right of the approach to the crossing from the other side, as well as at the right of the side street approaching the crossing from the station platform. As further protection, a crossing bell is mounted on the signal at the right of the crossing approaching from the east, and this bell rings from the time a train comes on an approach circuit until the gates are down.

Installation at Rockford

In Rockford Broadway street carries heavy local as well as through highway traffic. Approaching this crossing from the south, the view of approaching trains is obstructed by the embankment of the Chicago & North Western, the street going under the North Western track about 200 ft. from the I. C. crossing. Likewise, the view approaching the crossing from the north is cut off by factory buildings. The daily traffic on this line includes 8 passenger and 20 freight trains, as well as numerous switching movements. On account of these circumstances, this crossing has been considered hazardous and a watchman has been on duty at this crossing constantly for years. In order to provide better protection at this crossing, it was decided to install electric gates, controlled automatically by track circuits. Incidentally the annual saving in operating expenses at this point represents a return of about 45 per cent on the gross expenditure for the new gates.

The control of the gates at this crossing includes some special features. As train speeds in this territory are about 25 m.p.h. the track circuit for the eastbound approach on the main line is 1,593 ft. long and for the westbound 1,547 ft. On the passing track, the eastbound approach circuit is 922 ft. and the westbound 1,301 ft. In order to handle the operation of the gates when a train is standing on the passing track or when switching movements are being made on this track, a special arrangement has been provided. If one of the approach circuits on the passing track is occupied more than 50 seconds and the train has not approached nearer than 200 ft. to the crossing, the gates are raised to clear the crossing for street traffic. However, when the train passes a Fusticlo controller, located 200 ft. from the crossing, the gates are again lowered. When a train on the passing track is cut for the crossing it must be cut so as to provide a space of 400 ft.

The gates used on both the Rockford and the East Dubuque installations are of the same type, manufactured by the Partition Machinery Company, Chicago. In details of construction the installations are quite similar and, therefore, the explanation of details will be confined to the East Dubuque installation.

The operating mechanism and motor for each gate are housed in a cast-iron box mounted on top of a pedestal, set in a cast-iron base and mounted on a concrete foundation. The mechanism box can be rotated horizontally, rollers in the bottom of the box traveling on four inclined planes, so arranged that the force of gravity holds the gate in normal position, or will return it to that position if the gate is pushed around. This feature is provided to reduce the damage to a gate arm in case it is struck by an automobile or truck; another advantage is that if the gates are lowered with an automobile on the tracks, the car can push the gates around and get out without damage to the car or to the gates.

Each gate is equipped with an electric motor, which, through a set of reduction gears drives a disk with a pin, which fits in a slotted cam arm. From the horizontal down position the gate travels 70 deg. to the raised position. The disk and pin rotate 270 deg. to lower the gate and complete the revolution to raise the gate. Motion is transmitted to the shaft by coil springs fitted around the shaft. The purpose of these springs is to permit the gate arm to be stopped at any point without damage to the mechanism. For example, if the arm should come down on top of an automobile, it will be likely to bound back up without serious damage to the car or to the gate.

The Gates at East Dubuque Span a Distance of 77 Ft.

These automatic gates were placed in service on May 22, and although traffic has been fairly heavy on the highway as well as the railroad, the gates have operated satisfactorily to protect the crossing. The project was planned and installed by the signal department forces of the Illinois Central, with the co-operation of the division operating officers.

WITH GROSS REVENUES AT THE LOWEST LEVEL since the fiscal year 1919-20, when rates were substantially lower than at present, the Victorian (Australia) Railways reported for the year ending June 30, 1934, a net deficit of £735,119. This represents an increase of £39,323 over the net deficit of £695,796 for the year ending June 30, 1933, the less favorable showing being due entirely to the £271,009 drop in revenues since operating expenses were reduced by £140,998, interest charges by £42,099, and exchange costs on interest payments and redemption by £48,582. The reduction in operating expenses, the report points out, was effected despite increased wage awards amounting to £60,000.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended February 2 amounted to 598,164 cars, an increase of 42,396 cars as compared with the preceding week and of 32,763 cars as compared with the corresponding week of last year. It was also an increase of 112,105 cars as compared with 1933. The principal increase was in the loading of miscellaneous freight and coal, while merchandise, grain and grain products, and live stock showed decreases as compared with last year. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading

Week Ended Saturday, February 2, 1935

Districts	1935	1934	1933
Eastern	145,830	130,954	114,792
Allegheny	119,620	109,170	91,674
Pocahontas	42,809	39,904	34,172
Southern	87,498	89,101	77,522
Northwestern	71,022	66,422	53,367
Central Western	82,179	81,608	71,628
Southwestern	49,206	48,242	42,904
Total Western Districts	202,407	196,272	167,899
Total All Roads	598,164	565,401	486,059
Commodities			
Grain and Grain Products	25,959	31,361	25,524
Live Stock	14,147	15,627	16,037
Coal	155,434	134,648	107,382
Coke	9,733	8,962	5,619
Forest Products	24,361	20,246	14,450
Ore	3,446	2,471	1,420
Merchandise L.C.L.	154,366	162,290	161,962
Miscellaneous	210,718	189,796	153,665
February 2	598,164	565,401	486,059
January 26	555,768	563,100	475,292
January 19	562,955	561,902	499,554
January 12	553,675	557,266	509,893
January 5	498,073	500,813	439,469
Cumulative Total, 5 Weeks	2,768,635	2,748,482	2,410,267

Car Loading in Canada

Car loadings in Canada for the week ended February 2 totaled 46,023, as against 39,543 in 1934 and 42,407 cars for the previous week, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
February 2, 1935	46,023	22,767
January 26, 1935	42,407	21,299
January 19, 1935	40,789	20,797
February 3, 1934	39,543	20,660
Cumulative Totals for Canada:		
February 2, 1935	203,926	104,614
February 3, 1934	196,240	102,078
February 4, 1933	155,706	84,560

THE SOUTH AFRICAN RAILWAYS AND HABOURS ADMINISTRATION for the year ending March 31, 1934, reported a net improvement in financial results of £2,717,675 as compared with the previous year ending March 31, 1933. The 1933-34 surplus, after interest and all other charges, was £1,523,807 as compared with 1932-33 deficit of £1,193,868. Gross revenues for 1933-34 were 14.75 per cent in excess of those for 1932-33 but operating expenses rose 8.12 per cent as compared with the previous year. Thus it was the increased revenues which were in the main responsible for the more favorable showing, a situation which, the report says, "is fortunately different to that of the preceding three years of depression during which the Administration was compelled to take drastic steps, progressively with dwindling traffic, to reduce expenditure, involving heavy sacrifices by the staff." Another factor in the improvement, however, was the relief which the railways have received with respect to certain interest charges.

Annual Report of Bureau of Safety

THE Interstate Commerce Commission has issued the annual report of W. J. Patterson, director of the Bureau of Safety. Together with cognate matters from the annual report of the Commission, this makes a pamphlet of 23 pages. The report is dated December 1 and is for the fiscal year ending June 30, 1934.

The number of freight cars inspected during the year, 1,203,084, is about the same as in previous years and the percentage found defective was 2.48. Inspections of passenger cars and of locomotives also are little different from the records of preceding years. Inspections of freight trains arriving at terminals showed 98.52 per cent of the cars having operative air brakes. Details of the results of these tests, not printed in the report, are available for reference at Washington. Brake inspection of freight trains prepared for departure resulted in finding it necessary, on the average, to set out one car for every four trains.

Cars equipped, under the order of March 13, 1911, for experiment with running boards made of material other than wood, are now in service on four roads, the Baltimore & Ohio having 202 cars. Tests have been made by the American Railway Association, with the co-operation of the Bureau, of A B air brakes, after being in service 15 months. These tests were made in September, but the results are not yet edited for publication. Laboratory tests of automatic train pipe connectors are being continued.

The Bureau has given attention to safety appliance equipment for rail-motor cars, light-weight cars for high speed, and other new devices and combinations. The director of the Bureau is a member of the Mechanical Advisory Committee appointed by the Co-ordinator.

Under the hours of service law, railroads have reported 4,195 instances of excess service, an increase of 31 per cent over the preceding year. The number of cases of trainmen on duty more than 16 hours was 2,148, which is 629 more than in the preceding year; the increases being due principally to derailments, landslides, high water, adverse weather conditions and wrecking service. There was an increase of 307, to 1,691, of excess service on the part of telegraphers, principally due to the conditions just named, and to sickness of operators or in operators' families.

Statistics of automatic train control and cab signals for the year ending June 30, 1934, are only slightly different from those for January 1, 1934, which were reported in the *Railway Age* of May 26, page 775. The engineers of the Bureau have made periodic inspections and have compiled records of the operation of A.T.C. and cab signals; and numerous studies and special investigations have been made in this field in connection with the ARA committee. These include work on reports of false proceed conditions and of modifications made in apparatus by the Boston & Maine, the Lehigh Valley, the Central of New Jersey and the Oregon-Washington R. & N. Co.

The report summarizes the block signal statistics, which were reported in the *Railway Age* of May 26. In this connection, it is noted that coded rail currents, found successful with cab signals, are now being utilized for the operation of automatic wayside block signals. Three pages are devoted to a narrative of the 87 investigations of train accidents which were made during the year. New inventions under the head of safety devices

were examined to the number of 31 during the year, and opinions thereon transmitted to the proprietors.

Violations of the safety appliance laws, comprising 337 counts, were transmitted to the Federal courts during the year, of which 234 counts were confessed, 12 were dismissed and 8 were tried. Of the eight counts tried, one was decided in favor of the Government, two in favor of defendants and five are yet to be decided. Six cases of violation of the hours of service law have been handed to United States attorneys for prosecution.

A chapter on highway grade crossing accidents shows 10 persons killed and 45 injured, as compared with 12 and 53 in the year before; and still higher numbers in 1931. *Accidents to trains* caused by automobiles totaled 123; in 1932, 125, and in 1931, 91. In connection with this record, it is stated that the total number of grade crossings of railroads and highways, in existence on December 31, 1933, was 235,827. This total has decreased each year since 1929, but there are new crossings added every year, so that there has been a net decrease only during the last three years; namely: the net decrease shown in 1933 was 1,241; in 1932, net decrease 632, and in the year before that, 399.

Communications . . .

Wood Lining Not Used to Stop Condensation

To the Editor:

The *Railway Age* of November 17, contained an article, "Wood Lining for Freight-Car Roofs," by the Southern Pine Association, which I cannot let go unanswered because it is so unfair.

Wood lining, at no time, was used in a car to stop condensation or sweating caused by a lading giving off moisture; wood lining or roof boards were merely used to carry the loads of snow on the roof, or men passing over same, as the metal roofs did not have steel of sufficient thickness to carry such loads. Naturally, when steel of sufficient thickness was used to carry such loads, wood lining or roof boards were not necessary and not used.

It is true that on roofs of the *unventilated*, load-sustaining thick steel type, unlined, there will be as much sweat or condensation as on the wood lined roofs, for the reason that both of such roofs are in the same class, namely, not ventilated—this unventilated, load-sustaining, thicker steel roof keeping the moisture in the car, the same as does a wood-lined roof.

Any engineer who has any knowledge of condensation will tell anyone that ventilation lessens sweating or condensation.

A wood lining does not lessen sweating or condensation:—such moisture falls back on the lading before it can be absorbed by the wood lining, the same as on the unlined, *unventilated* load-sustaining thick steel roof.

However, there are roofs of load-sustaining thick steel, unlined with wood that permit of *ventilation* which have a less amount of sweat or condensation than any wood-lined roof.

It is unfortunate that the Car Committee of the Association of American Railroads does not see fit to test out such *ventilated* roofs along with the *unventilated* load-sustaining thick steel roofs, unlined, and the wood-lined roof.

Hundreds of tests have shown that the *ventilated*, load-sustaining thick steel roof, unlined, has a less amount of condensation or sweating than a wood-lined roof, as the wood-lined roof is not ventilated.

When an automobile begins to have condensation or sweat appear in the shape of moisture on its inner surfaces, one does not line such inner surfaces of the automobile with wood or lumber; one merely permits a little *ventilation* (through the windows) and the condensation or sweating disappears.

The Southern Pine Association, in its effort to create a market for lumber, should be fair and qualify its remarks by making an exception of the roof that has the least amount of condensation or sweat—that is, the unlined, *ventilated*, load-sustaining thick steel roof. Otherwise, they are causing injury to another business, and it may be necessary to appeal to the much-abused N. R. A. on unfair competition.

W. D. Thompson,
President, Hutchins Car Roofing Company, Detroit, Mich.

Seeking Enlightenment

Atlanta, Ga.

To the Editor:

May I seek some enlightenment through your columns?

(1) Many brainy men seem to have varying opinions as to what will bring back prosperity. Some of them hold that a resumption of heavy industry operation on a sizeable scale will do it; others say heavy purchases of equipment and materials by railroads is the essential need, while at least one famous man seems to have given up hope that beer will bring back the good old days and is urging people to buy automobiles. What is the best solution?

(2) Railroad employees are going strong for the proposed pension. Who is going to pay it? If there were any young men working for railroads they could pay their part and help out on those about ready for retirement. As it is, those who will benefit would only pay in for a few years, so where is the money to come from? The "old heads" in most cases refused to shorten hours for benefit of younger men, when hard times hit, so now who do they expect to pay for their pension fund?

(3) I understand that in traveling or shipping freight over a large rail system, one is really paying fare or freight over numerous small lines operating under a parent company and that "guaranteed stocks" of these small links must be paid. In other words, dividends to about a score of lines before parent company has anything coming. This is supposed to be entirely lawful and good business, but isn't it throwing business to competition not thus handicapped?

If anyone can supply the answer to these questions I will be obliged.

Numbskull.

Encourages Use of Automobiles to Sell Gasoline

Chicago

To the Editor:

The Texas Company is employing an idea to promote the sale of gasoline and oil which should be of interest to railroad traffic departments and others. Feeling that more automobile travel means a greater sale of gasoline and oil, it is encouraging those attending conventions to travel in their automobiles. The prospect is supplied with a road map and a letter calling attention to the reasonableness of the trip. One of the recent sales letters follows:

Dear Motorist:

Are you planning to attend the annual meeting of the American Society of Civil Engineers scheduled to be held in New York City, January 16, 17, 18, 1935? Doubtless you'd like to do so, but have hesitated to make definite plans because of the cost of the trip.

The past summer we asked motorists to whom we sent routing suggestions and road condition information to tell us what their trips cost them. A great many of them did so. Of this number we've taken reports from the drivers of 1,110 cars which carried 3,263 persons over 2,488,234 miles (in every state and all seasons of the year) for a total of $100,644.90, which is barely over 4 cents per mile for an average load of about 3 persons per car, hotels, meals, Fire Chief, Crack Proof oil, storage and incidental expenses included.

Doubtless several of your friends would like to go along with you to the meeting. The cost would be very low for each of you and the roads indicated on the enclosed Texaco Trip Map will be comfortable—regardless of the season—for the State Highway Departments of every state make especial efforts to keep them free from snow and safe to travel over all the year 'round.

We'll be glad to send you, without obligation to you, information on any side trips you'd like to make. Use the enclosed card and return mail will bring you our reply.

R. D.

Odds and Ends . . .

Blackville

The Fort Smith & Western, until somebody disputes it, claims the distinction of serving the largest all-negro town in the country. The station in question serves Boley, Okla., with a population of 1,000.

Milwaukee Museum

Local railroaders and those passing through will find much to interest them in Room 854 of the Union station, Chicago. The Chicago, Milwaukee, St. Paul & Pacific has just opened the Milwaukee Road Museum there, with a huge collection of objects of every sort dealing with railroad history.

The Last Nicknames

Our anonymous correspondent with the telegrapher's fist sends in two final nicknames, as follows:

Georgia Southern & Florida—Go Slow & Flag.

Richmond, Fredericksburg & Potomac—Rich Folks & Pedigrees.

Oscar

A month or so ago, this department ran an item regarding "Oscar," the hermit dog of the Illinois Central terminal, who has been there for several years without permitting anyone to approach "him." Now it is our turn to apologize, both to our readers and to "Oscar." The other day, as duly reported in the Chicago newspapers, "Oscar" gave birth to quintuplets. Both mother and puppies are doing well.

Quite a Journey

A lost ticket, which disappeared in a Boston & Maine train at Nashua, N. H., over four years ago, was recently found at Circle Hot Springs, near the Arctic Circle, in Alaska. A lady passenger boarded the train at Worcester, Mass., one day in 1930, handed her ticket to the conductor, who punched and returned it for presentation to the conductor who took charge leaving Nashua. The ticket could not be located at Nashua and the trip was continued with the understanding that the ticket should be mailed in when found. It turned up in the cuff of the lady's coat while she was traveling in Alaska.

The Pheasant Peril

A 10-car Pennsylvania train was halted near Trenton, N. J., recently, while racing north at 70 miles an hour, by a pheasant said to weigh 6 lb. The train weighs 853 tons. The train had passed Penn Valley, near Trenton, when the pheasant crashed through the window beside Frank Pearl, the engineman. The heavy pane was shattered and the bird struck Pearl, knocking him to the floor of his cab. As the engineman fell, his hand was knocked from the control lever, automatically operating the "dead man" safety device, cutting off the power and halting the train. Pearl, scratched about the face, neck and ear by the shattered glass, brought the train to Trenton, where another electric engine was hooked on, with a special duty engineman added to the crew.

Feline Railroader

Dogs that have risen to great heights among railroad workers because of their almost human habits, meeting trains regularly at stations, following switch engines, taking up their homes in roundhouses, and performing strange feats in affection for locomotives, have been the basis of yarns which have been spun for miles along the steelways, but it remained for Black Tom, a three-legged tomcat, to carve a niche for the felines in the lives of the rail workers. Black Tom, so the story goes along the Northern Pacific, turned up several years ago in the railway company's roundhouse at Yakima, Wash. According to George Cook, foreman, Tom would sit by the hour while the men worked on the locomotives. He was there to greet them when they came in and would follow them and the locomotives along the tracks. He adopted the roundhouse and car shops as his home and declined more comfortable beds in his preference of the boiler room coal bin as his sleeping place. Some weeks ago, however, Tom turned up missing. A diligent search was made, but to no avail, until he dragged himself piteously to the roundhouse with one leg dangling. A locomotive had mangled his front left leg. Despite the depression, railroad workers established a fund and Black Tom was hospitalized. A veterinary removed the ailing limb, and now Tom is back on duty at the roundhouse, the loss of one of his legs, notwithstanding.

More Twins

CHICAGO

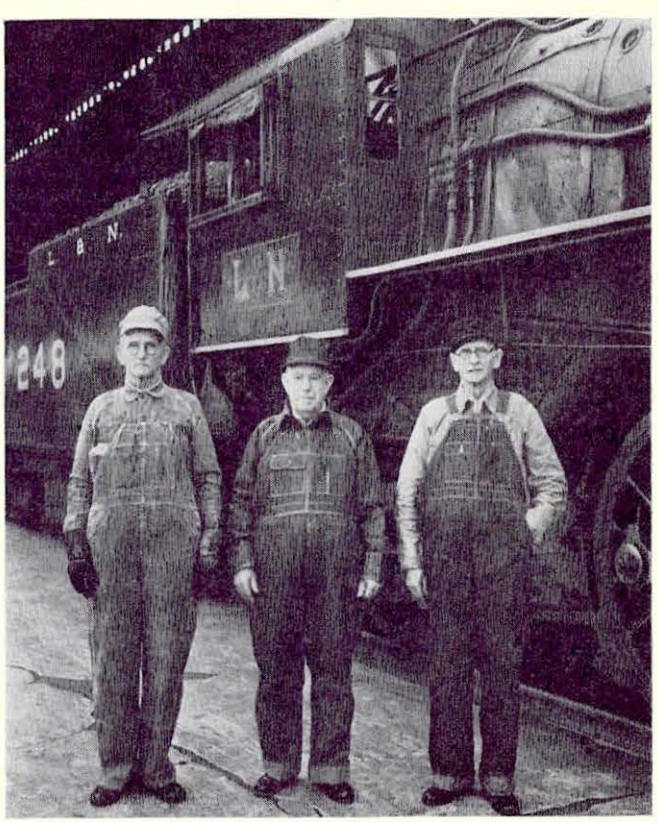
TO THE EDITOR:

Regarding the item which appears under "Odds & Ends" for January 19, relative to "Twins." The Sweeney brothers' claim is disputed by the Cogley twins, James E. and John L., Baltimore & Ohio enginemen, who not only pull a throttle out of the same terminal, Garrett, Ind., but also operate the same run between there and Chicago, working opposite each other seven days per week, using the same engine on their run, which is the local passenger train. The Cogley twins have been running an engine on the Baltimore & Ohio since 1896.

F. K. MOSES,
Master Mechanic, Baltimore & Ohio Chicago Terminal.

Locomotive Dress Rehearsal?

Did you ever see a locomotive dress-rehearse for a radio broadcast? No? Well we have. It's a regular occurrence every weekday at about 5 o'clock when The Pan-American nears station WSM's giant tower at Nashville for its daily broadcast. The engineman, be it Tom Burns, Jack Hayes or Bill McMurry, will reach up and give the whistle cord a vigorous tug. This is to afford a final test before The Pan-American whistle is scheduled to be blown through the air to the WSM microphone as the train passes the broadcast tower a few minutes later and thence to be carried into thousands of homes throughout the



The Three Radio Stars, with Their Bulky Musical Instrument in the Background.

nation. At the same time the fireman will also clang the bell to be sure it's in proper trim for the broadcast. It's not that these veteran enginemen are finicky, but simply that they cater to a highly critical audience. If the bell doesn't clang properly, or the whistle doesn't have just the correct tone, both WSM and the engineman are certain to receive a batch of letters advising of the shortcoming and suggesting remedies.

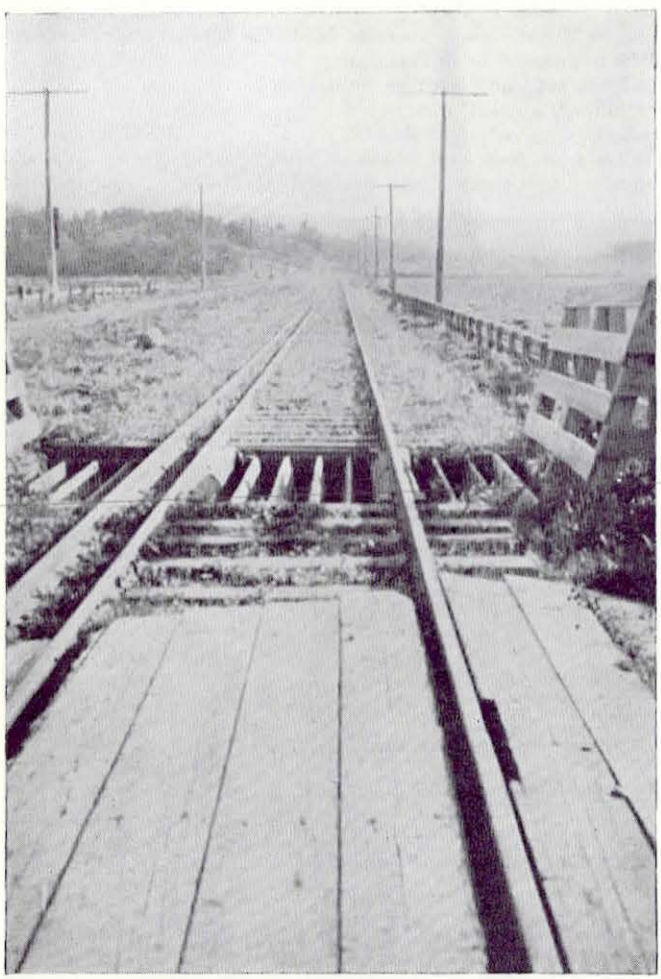
Each of the three old-time enginemen running the train has his own special following among the large radio audience which has become attached to The Pan-American broadcast. Listeners claim to be able to tell which of the three is at the throttle just as soon as the bell, whistle and sound of the train rushing over the rails are heard in their loudspeakers. Bets have been made on this score, a check being made with the WSM announcer. Few programs go on the air with greater care for their preparation and presentation than the daily broadcast of The Pan-American, proud "Queen of the Old Reliable."

Still a Railroader

William B. Reed, colored, "Uncle Billy" to everyone on the Nashville, Chattanooga & St. Louis, had served that line as messenger for 48 years. In his last illness he announced that what he wanted on his grave was not a stone, but an old freight car wheel, one which, like Uncle Billy himself, had seen lots of service. His request has been complied with, a car wheel rests at the head of his grave, and on it is inscribed the epitaph he wrote for himself, as follows:

> "Born December 26, 1849. Joined Church July 27, 1866. Employed N. C. & St. L. Ry. March 3, 1883. Honor Roll, June 1, 1931. Died August 26, 1934. His creed of Life—I Love My Lord. I Love My Home. I Love My Job."

* * *



Arcata & Mad River R. R. (California) So Far as Is Known, Is the only 3 ft. 9¼ ins. Railroad in the World. Third Rail Is for the Standard Cage Cars of the Northwestern Pacific

New Books...

Federal Securities Act Procedure, by J. K. Lasser and J. A. Gerardi, 388 pages, 9 in. by 5⅝ in. Bound in cloth. Published by McGraw-Hill Book Company, Inc., New York, Price $4.

This book is put forth as a full and authoritative interpretation of the Federal Securities Act of 1933 as amended in all its phases. Holding it to be a fact that "the Securities Act is not so permeated with technicalities and snares that legitimate financing may not proceed in the face of its requirements," the authors have dedicated their treatise to the elucidation of methods of procedure in the language of the accountant and the business executive, thereby providing "a handy outline of the mechanics of preparing the audits, forms, and statements required by the Act." Mr. Lasser is a certified public accountant in New York and New Jersey, while Mr. Gerardi is a member of the bar of the District of Columbia.

American Railway Signaling Principles and Practices. Pamphlet, 46 pages. 6 in. by 9 in. Published by the Signal Section, A.A.R., 30 Vesey Street, New York. Price 25 cents; to members and railroad employees 15 cents.

This is chapter XV of the series on this subject, begun by the Signal Section some years ago. It is devoted to automatic block systems and contains descriptions of the circuits of the principal schemes of automatic block signaling. It is illustrated by nine detailed diagrams. The usual elaborate list of questions is given at the end.

Nineteen of these chapters have now been published, each in a separate pamphlet, and the only numbers yet to be dealt with are chapters 1, 4, 21 and 22. For the whole 19 chapters now available, the price is $6 to non-members and $4.10 to members and railroad employees. The secretary has also for sale, at one dollar, a binder, which accommodates 13 chapters.

Freight Train Resistance, Its Relation to Average Car Weight. By Edward C. Schmidt, professor of railway engineering. Reprinted by the Engineering Experiment Station, University of Illinois, Urbana, Ill. Bulletin No. 43. 86 pages; paper bound. Price, 90 cents.

Bulletin No. 43 was first published in May, 1910. It covered a series of dynamometer-car road tests begun in April, 1908, and concluded about a year later. These tests were planned to determine the resistance of freight trains under usual operating conditions and to disclose the relation existing at any given speed between train resistance and average car weight. The results are the foundation on which adjusted locomotive ratings have since been developed. The reprint contains all the original material of use in a study of train resistance and tonnage ratings, including full discussions of calculation methods and resistance-speed curves for each of the individual tests made. This bulletin, which until now has long been out of print, still remains the basis for the information published in most handbooks and text on the resistance of railway freight cars.

Road and Rail in Forty Countries, by Dr. Paul Wohl and A. Albitreccia. 455 pages, 7½ in. by 5 in. Bound in cloth. Published by the Oxford University Press, London, Eng. Price $6.

This work, described as an international handbook on the railway and highway transport industry, was prepared after a comprehensive survey conducted under the auspices of the International Chamber of Commerce. Because this sponsoring organization regards present conditions in the transport field as not merely a transport problem but rather one "of first-rate importance in the organization of economic life today," the study avoids discussions "of too technical a nature, and is addressed to that great proportion of the public which is affected by and interested in a sound organization of the transport system." Thus the book is in the main designed to provide a factual background to the pertinent question of rail and highway competition and to constitute a guide for all interested in the problems of co-ordination. This study, together with a previous one on the same subject, was undertaken in accordance with a resolution adopted at the International Chamber's last Congress in Washington, D. C., in 1931.

NEWS

Baltimore & Ohio to Pay Dismissal Compensation

Plan brings withdrawal of labor's opposition to I.C.C. approval of co-ordination project

The Interstate Commerce Commission, Division 4, on February 7 approved the application of the Baltimore & Ohio for authority to operate under trackage rights over the line of the Pittsburgh & Lake Erie between McKeesport, Pa., and New Castle Junction, 58 miles, which will give the B. & O. a route 6.8 miles shorter than its own line, with 457 feet less rise and fall in each direction, permitting cheaper, faster, and safer operation, and enable all the B. & O.'s through passenger trains to serve Pittsburgh. It will continue to operate its own line for local passenger and freight service and for through service between Pittsburgh, Buffalo, Rochester, and intermediate points. It was estimated that this would effect net savings of at least $52,578 a year, after paying the minimum fixed rental of $250,000 a year, which is to cover the operation of 22 trains a day. Additional trains are to be paid for at the rate of $30 a train. It was also estimated that it might displace about 50 employees.

Approval was granted by the commission shortly after the opposition of the railway employees' organizations had been withdrawn, following an agreement reached with the management for compensating the men. The terms of the agreement are not stated in the commission's report but had been stated the week before in Co-ordinator Eastman's report in connection with the discussion of his proposed plan of dismissal compensation, in which he said it was understood that the first year's net savings which result from this new arrangement are to be paid to those displaced employees who are eligible to receive such compensation.

Strenuous opposition to the plan had been offered by the Railway Labor Executives' Association and other representatives of the employees both before and during the hearings on the applications last Fall. It was brought out at the hearing that they had insisted on some arrangement for the protection of the employees who might be displaced but that the railroad had taken the position that the project did not come within the scope of Section 7(b) of the emergency transportation act, although it had promised to treat the employees fairly. The latter took the matter to Co-ordinator Eastman who wrote a letter to President Willard expressing the conclusion that the project did come within the scope of the labor restrictions in the law, as an action taken pursuant to its authority, on the ground that it had been discussed in 1933 by H. J. German, then Eastman's eastern regional director, with Mr. Willard and F. E. Williamson, president of the New York Central, and later by the two presidents who were members of the eastern Regional Co-ordinating Committee. He said it was not only one of the kind of projects which the law contemplated but that the law made it the duty of the co-ordinating committees on their own initiative to carry out the purposes of the law relating to co-ordination of facilities, and that the independent action was a "Circumvention" of the law. The case had been set for argument before the commission on February 6 but on January 26 the labor representatives advised the commission of the withdrawal of their objections, the argument was cancelled, and Division 4 announced its approval of the application on February 8. Neither the report of Division 4 nor the record in the docket of the case contains any reference to the agreement reached between the railroad and the labor organizations.

Modification of Lighterage Order Denied

The Interstate Commerce Commission announced on February 7 its denial of the petition filed by the defendant railroads in New Jersey lighterage case for a modification of its order to permit them to maintain and establish in the future motor- or water-competitive rates between points in the lighterage limits now included in the New York group and New England points without extending such rates to and from other points in New Jersey.

R. R. Credit Corporation Makes Fourteenth Distribution

The Railroad Credit Corporation, according to report as to its financial condition filed with the Interstate Commerce Commission, has, through liquidating distributions since termination of its lending period on June 1, 1933, returned $21,353,344 or 29 per cent of the net emergency freight revenues collected by it. Of this amount, $9,442,565 has been in cash and $11,910,779 in credits on obligations due the corporation. The fourteenth liquidating distribution was made on January 31, to participating carriers and amounted to $726,166 or one per cent. Of the total amount, $344,834 was in cash and $381,332 in credits on carriers' obligations. Cash receipts in January amounted to $210,852, of which $181,335 was on account of loans, $29,508 for interest on loans and $9 from miscellaneous sources.

Home Modernization Plan Increases Carload Traffic

F. H. A. notes greater demand for freight service by capital goods manufacturers

Increased demand for freight service by manufacturers of capital goods products as a result of the spread of the home modernization movement fostered by the Federal Housing Administration is noted by the F. H. A. in information it has received from several railroads.

An executive of the Boston & Maine said the number of cars handled for three typical manufacturers dealing in supplies used largely in home construction and repair is indicative of the increase noted in shipments over its lines.

"For the first concern we handled only 5 cars in 1933 and in 11 months of 1934 we handled 14 cars of their products; the second manufacturer required but 78 cars in 1933 and with one month remaining in 1934 his car needs had already reached a total of 109; the third company needed only 31 cars to transport its output in 1933 but by December 1934 it had used 67 cars over our road."

The Bangor & Aroostook has reported an increase in business of 65 per cent for the year 1935 over the lumber shipments noted during the immediately previous twelve-month period.

Car-load shipments of roofing materials and building paper had risen 160 per cent in one year, according to a report made by the Erie as of the close of 1934.

December comparisons of lumber movements over the Atlantic Coast Line route indicated an increase of 6.8 per cent for that month in 1934 in contrast with the totals for the same month the year immediately previous. Lime shipments carried by the Louisville & Nashville were one-fifth greater for the past December than they had been in December 1933.

Movement of all types of building materials over the lines of the New York Central Railroad indicated a gain of 41 per cent for November when compared with the volume of business of the same type handled during November 1933.

Annual Meeting Chicago Traffic Club

A total of 1,200 representatives of railroads and industries attended the 28th annual dinner of the Traffic Club of Chicago on February 7. Dr. Arthur E. Bester, president of the Chautauqua Institute, New York, was the principal speaker, his subject being, "Elements of Leadership."

Southern Would Continue Reduction in Coach Fares

Road's passenger traffic manager describes its experiments as hearings resume

Hearings in connection with the Interstate Commerce Commission's investigation of passenger fares were resumed at Washington on February 13 before Commissioner Porter, Examiner Koch and a committee of state commissioners. At the outset Examiner Koch asked that anyone who desired to attack the statistical material put into the record at the earlier hearing as a part of the Passenger Traffic Report prepared by Co-ordinator Eastman's Section of Transportation Service notify the commission so that A. F. White, assistant director of the section, might be present. Thomas P. Healy, general solicitor of the New York Central and one of the counsel for the eastern roads in the hearing, replied that at the proper time a motion would be made to strike the material from the record.

At the previous hearings testimony had been offered on behalf of the eastern and western lines, which is now being followed by that on behalf of the southern lines. F. L. Jenkins, passenger traffic manager of the Southern, after describing its experiments with reduced fares and particularly that which has been in effect during the past year with a rate of 1½ cents a mile in coaches and 3 cents a mile in parlor and sleeping cars, strongly urged a continuance of that basis. He suggested that further time be allowed for experimentation with round-trip fares good in sleeping and parlor cars, saying that favorable results had been obtained with 2-cent fares for round trips good for 15 days and 2½ cents for round trips for longer periods. He said that after all their study and experimentation it was the judgment of the Southern officials that an increase in the coach fare to 2 cents a mile "would put us right back where we were in 1933," and that to lessen the spread between the fare for Pullman service and the coach rate by increasing the latter would cause a falling off of coach business without helping the Pullman passenger any, while to do it by reducing the Pullman fare would cause a loss in revenue. If there must be some reduction in the spread he favored a reduction of the 3-cent fare, but he pointed out that the fare for Pullman passengers had already been reduced by the elimination of the surcharge. Commissioner Porter at this point called attention to the bill pending in the Senate to abolish the surcharge, which would also, by its language, prohibit a higher charge for Pullman passengers than for coach passengers.

After telling of the large increase in passenger traffic on the Southern system which followed the general reduction in fares, Mr. Jenkins said the railroad had been trying to find out what rate would bring the public back, regardless of the cost, and he replied affirmatively to a question as to whether the amount the passenger would pay was not more important than what the railroad thought it ought to pay. "With empty equipment running," he said, it was more important. Asked what he thought of a policy of charging 1½ cents a mile for local service and 2 cents a mile for through inter-carrier service, as suggested in the Turney report, Mr. Jenkins said he thought the principle of charging more for a long haul was wrong, but in reply to further questions he said he did not care to comment on the Turney report until it had been further analyzed.

J. S. Tassin, general statistician of the Southern, put into the record a series of exhibits illustrating its passenger experience which showed that after fares were generally increased the railroad lost a large part of its short-haul business, during a period while Pullman travel was increasing, and that after it reduced fares the short-haul business increased enormously. In a recent month, he said, the average journey with the 1½-cent fare was 56 miles, the passenger revenue had increased 331 per cent, and the passenger mileage had increased 761 per cent. Moreover, the other fare bases, he said, had justified themselves from the standpoint of public response.

German Railways Plan to Place Large Equipment Orders

The German railway equipment industry is showing considerable activity in anticipation of substantial orders from the German railways, according to a recent report from Vice Consul J. H. Wright at Cologne to the United States Department of Commerce. The report states that negotiations are now under way for the delivery of new rolling stock during the first half of this year.

Included in the order will be locomotives and cars of new design, particular attention being given to streamlined equipment for freight as well as passenger service. The report also reveals that experiments are being conducted with self-propelled freight cars of the Diesel-electric type, these cars to be of welded steel and equipped with unloading devices. It is also hoped that it will be possible to design these motor freight cars for speeds as high as 80 m.p.h.

P. R. R. New York-Washington Electric Service Inaugurated

Through electrified passenger train service between New York, Philadelphia, Pa., Baltimore, Md., and Washington, D. C., was initiated by the Pennsylvania on February 10. At 4.30 p. m. the "Congressional" left Pennsylvania Station, New York, for the Capital, 30 minutes after the northbound "Congressional" had left Union Station, Washington. Each train was hauled by a streamlined electric locomotive. Other trains operating over the route will be successively equipped with electric power until the entire passenger service, both through and local, is electrically operated. This is expected to be about March 15.

At the outset the "Congressional," both north and southbound, will run on its present schedule of 4 hr. 15 min. between terminals. This schedule will be quickened step by step until eventually it is reduced to 3½ hr. Electric operation of the through freight service will follow in the near future, and will be accompanied by a material quickening in the schedules.

Transportation Conference Planning New Meetings

Group headed by Harry A. Wheeler will be re-convened this month at Washington

Opportunity for an expression of opinion on the part of the users and furnishers of transportation on the various proposals for transportation legislation included in the recent report of Co-ordinator Eastman, as well as those which may be included in the expected message of President Roosevelt to Congress on the subject, will be afforded by the re-convening in Washington about February 26 of the Transportation Conference of 1933, of which Harry A. Wheeler, president of the Railway Business Association, is chairman. The conference is to be re-convened as a result of the votes of the various interests represented in the conference of 1933, pursuant to a resolution adopted at the time of its report in March, 1934, which provided for re-convening at the call of the chairman, to consider such developments as have arisen since that time, chief of which is the Co-ordinator's report.

The Transportation Conference of 1933 was organized at a meeting in New York on August 10 and 11, 1933, and its report was issued, after nine months of study, in March, 1934. The conference at that time went on record in opposition to government ownership of the railroads and in favor of a relaxation of Interstate Commerce Commission regulation of railroads and an extension of federal regulation to include highway and waterway transportation. It is understood that it is not proposed to go over again the ground that was covered in the report of last March, but the Co-ordinator's latest report raises a number of new questions as to which the conference has not expressed itself in detail and an effort will be made to ascertain the extent to which there is general agreement so that the number of issues on which opposition might be expressed at hearings before Congressional committees may be reduced.

The organizations represented in the conference include the Association of American Railroads, the American Short Line Railroad Association, the Railway Business Association, the Security Owners' Association, the American Bankers' Association, the American Highway Freight Association, the American Iron & Steel Institute, the Association of Regulated Lake Lines, the National Association of Manufacturers, the National Industrial Conference Board, the Association of Mutual Savings Banks, the Lake Carriers' Association, and the Canal Carriers' Association.

Railway Employment Slightly Reduced in January

As of the middle of the month of January, Class I railroads reported to the Interstate Commerce Commission a total of 958,905 employees in service. This is a decrease of .77 per cent as compared with the number in January, 1934, and a decrease of .19 per cent as compared with December.

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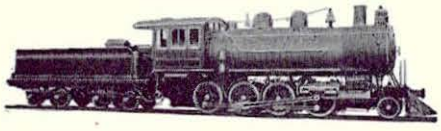
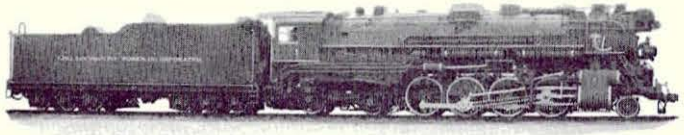
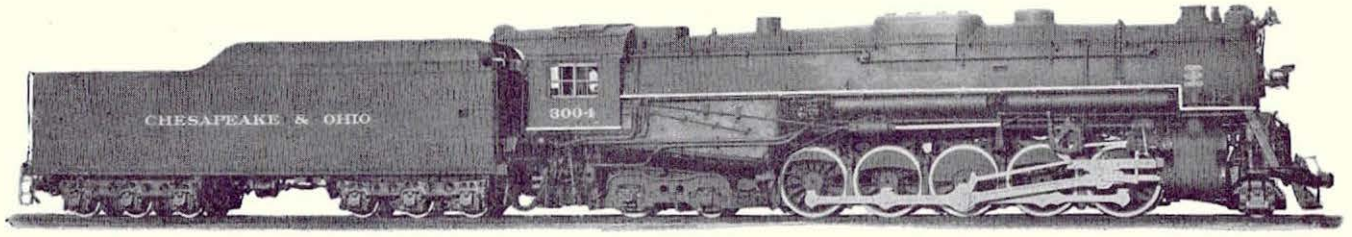
FREIGHT LOCOMOTIVES HAVE BEEN MODERNIZED

Freight Locomotive development and design have kept pace with the modern trend for improvements.





All were representatives of their times. Step by step they have been improved, leading up to the Super-Power locomotive of today, which handles freight traffic with maximum efficiency and lowest operating cost.



LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

Study Finds Inequities in the Per Diem System

Section of car pooling releases data on railroad-owned freight car ownership costs

In connection with its study of the railroad equipment situation, Co-ordinator Eastman's Section of Car Pooling has made a study of railroad-owned freight car ownership costs as related to car-hire, pointing to the inequities said to exist in the present per diem method of settlement for the use of interchange freight cars. For Class I railways the ownership cost of the average freight car is placed at 70.5 cents per car per day, whereas the per diem rate is $1.00. It is also shown that the ownership cost varies by types of cars. The study was made by N. D. Ballantine, assistant director of the section and is accompanied by an introductory memorandum from the director, O. C. Castle, stating that the information will be helpful to the railroads in their further study of the proposed box car pool.

Mr. Castle says in the memorandum:

"There appears to be a general lack of appreciation of the inequities which exist in the present per diem method of settlement for the use of interchange freight cars.

"This has been brought to our attention quite forcefully by the reaction to our proposed plan for a box car pool and the character of questions raised in the discussion of the proposal.

"If we accept the current per diem rate ($1.00 per day), as representing the ownership cost of the average freight car, the railroads are carrying a daily charge of approximately $2,000,000 for this item of transportation expense.

"This expense, which is equivalent to more than 20 per cent of the current freight and passenger revenues of Class I railroads, is borne by the railroads generally, but it is governed by the equipment policies of the individual roads. There is ample evidence that these policies in many instances have been adopted solely on the basis of what is deemed to be individual interest without regard to the interests of railroad transportation as a whole. In some cases mistaken policies have prevailed, due to a lack of accurate information respecting interchange conditions and car ownership costs, or to the failure to give proper consideration to all of the factors involved.

"The practical suspension of car construction and the deferment of maintenance during the past three years have brought about a condition unprecedented in the history of railroading. Never before has there been such an opportunity to attack the freight car problem from the standpoint of the country as a whole and to adjust the methods of interchange and the basis of settlement for car hire to conditions as they exist today.

"It seems appropriate at this time, therefore, to bring to the attention of railroad executives and other interested parties some facts and figures which have been given too little weight in past consideration of car service rules and rates."

Mr. Ballantine's conclusions are as follows:

(1) The cost of freight-car ownership is made up of fixed, or constant, elements which include the cost of money (interest, discounts and commissions), amortization (depreciation and retirement), insurance, and taxes; plus a variable item for repairs and dependent upon the elements and usage.

(2) For Class I Railways the ownership cost of the average freight-car was found to be 70.5 cents per car per day; per car-mile it was 2.74 cents.

For carriers favorably situated to force their cars into interchange service, the current per diem rate provides an urge to build cars to the extent that their average ownership costs are less than current per diem rates.

For carriers whose situation is otherwise, there is an apparent economy in using foreign cars during peak periods in preference to assuming the burden of ownership on surplus cars over long periods of ligh demand.

(3) The ownership costs per car per day by types vary from 29.6 cents for a flat car to $1.08 for a refrigerator, with coal and box cars averaging 60.2 and 84.1 cents, respectively.

"The flat per diem rate of $1.00 per car is lacking in equity and reciprocity to the extent that interchanges by classes of cars fail to balance."

Illinois Central Car Repairs

The largest amount of classified equipment-repair work ever turned out on the Illinois Central in a comparable length of time was completed during 1934 when 14,000 freight cars, 300 passenger cars and 700 locomotives were reconditioned.

U. P. M-10,000 in Service

The Union Pacific streamline train, M-10,000, was placed in service between Salina, Kan. and Kansas City, Mo., on a 3½ hour schedule for the 187 miles on January 31. During the first six days of operation, it carried an average of 100 persons a trip. The train stops at Lawrence, Topeka, Wamego, Manhattan, Junction City, and Abilene. It leaves Salina at 7:00 a.m. and arrives in Kansas City at 10:30 a.m., leaves Kansas City at 4:00 p.m. and arrives in Salina at 7:30 p.m.

Railway Labor Executives Consider Legislative Program

A delegation representing the Railway Labor Executives' Association conferred with President Roosevelt at the White House on February 7 regarding its legislative program, including the six-hour day, full-crew, and train-limit bills, and voiced objections to several features of the legislation recommended by Co-ordinator Eastman in his report of January 30. The labor leaders had asked for a plan of dismissal compensation but object to Mr. Eastman's proposals for further co-ordination projects which would displace additional employees. The association is holding a meeting in Washington this week in connection with the legislative program.

Seatrain Service Found to Be in Public Interest

Report of I.C.C. investigation into the operation made public on February 12

The Interstate Commerce Commission on February 12 made public its report of the investigation into the operations of Seatrain Lines, Incorporated, finding that the service between Hoboken and New Orleans, in which the Seatrain carries loaded freight cars, "is being operated in the public interest and is of advantage to the convenience and commerce of the people and that extension of the time within which such service may continue will neither exclude, prevent nor reduce competition on the route by water under consideration." The commission also found that it has jurisdiction to require the establishment of through routes between rail and water carriers, and, where such through routes are established pursuant to its order or voluntarily, to require the rail carriers parties thereto to interchange cars with the water carrier, if that is the reasonable and appropriate method of interchanging traffic over such through routes. Whether such through routes exist, and, if not, whether they should be established, are issues to be decided in another proceeding.

The commission found that the interest of the Missouri Pacific and the Texas & Pacific in Seatrain is such an interest as is contemplated by Section 5(19) of the interstate commerce act, which it holds refers to "any interest," and that as such interest existed prior to the Seatrain's engaging in coastwise traffic between Hoboken and New Orleans, the inauguration of such service without authorization was in violation of the law but that otherwise, since October 1, 1933, does not appear to have violated any of the provisions of the act. It was also found that the Missouri Pacific and Texas & Pacific may and do compete for traffic with Seatrain. The commission also finds no violation of Section 7 of the act, which prohibits any arrangement whereby carriers may prevent the carriage of freight from being continuous from the place of shipment to the place of destination, saying that the evidence does not show that defendant railroads entered into any agreement to withhold delivery of their cars to Seatrain.

Commissioner Mahaffie dissented, expressing the opinion that the majority erred in the construction placed on Section 5 and Commissioner McManamy concurred with him.

"The Seatrain method of transportation," the report says, "was developed for the purpose of eliminating the expenses, disadvantages and delays incident to the transfer of lading between railroad freight cars and the holds of vessels. By means of the loading machinery described in the original report, loaded freight cars are lifted from the tracks of the connecting railroad at one port, deposited on the Seatrain vessel, which carries them to the port of destination, lifted from the vessel to the tracks of the connecting railroad, and moved to final destinations without

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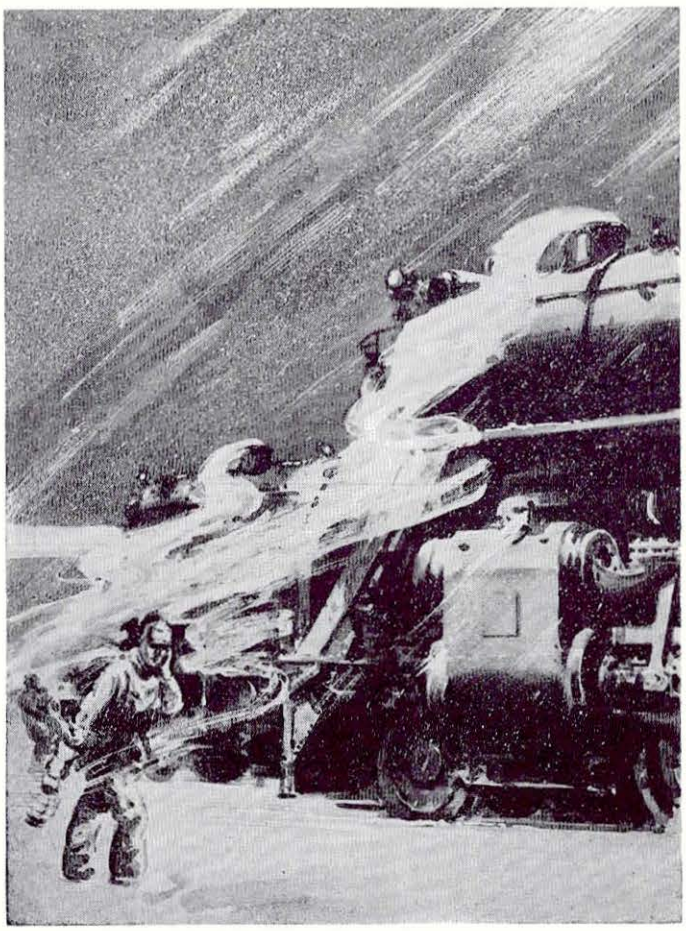
THE UNEXPECTED COMES WITH WINTER



Winter weather cannot be definitely anticipated. A clear, dry day may be a roaring snow storm before the train reaches its terminal.

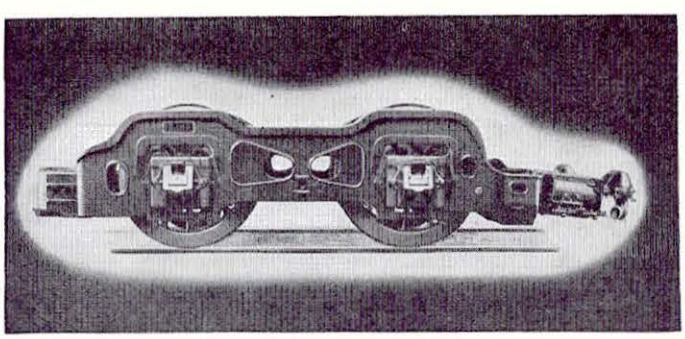
In such cases the extra tractive effort the Booster adds, may be just the margin that gets the train through without serious delay.

Compare the performance of Booster equipped power with engines in the same class not so equipped.

Compare the tonnage hauled and the time between terminals.

But most of all compare the availability of such power and the cost of maintenance per 1,000 ton miles.

The Booster is your friendly ally in good weather or bad.



No locomotive device is better than the replacement part used for maintenance. Genuine Franklin repair parts assure accuracy of fit and reliability of performance.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

having the contents disturbed in any way. The service performed by Seatrain is generally conceded to be superior to that afforded by steamships of the usual type.

"By using Seatrain service shippers obtain what is practically equivalent to all-rail service, except for the somewhat longer time in transit, at rates less than the all-rail rates. They are also saved packing and handling expenses necessarily incurred if the movement is over the break-bulk water routes. In addition, certain classes of bulk freight which cannot be handled in vessels of the usual type, and which cannot bear the all-rail charges, can be handled by Seatrain, and thus markets opened up for them which theretofore could not be reached."

I. C. C. Bills Passed

The Senate on February 12 passed the bill recommended by the Interstate Commerce Commission in its annual report providing that upon the expiration of their terms of office commissioners shall continue to serve until their successors are appointed and have qualified. This is intended to avoid such a situation as now exists since the President failed to reappoint Commissioner Farrell on the expiration of his term on December 31 and has also failed to make another appointment so that there is a vacancy on the commission. The Senate also passed the bill, which had also been passed by the House, changing the date for the filing of the commission's annual reports from December 1 to January 1.

Railway Engineer (London) Now Merged with Railway Gazette

The Railway Engineer (London), which has been issued as a separate monthly publication for the past 55 years, will henceforth be merged into the Railway Gazette (London). The January issue of the Railway Engineer was its last as a separate publication and the Railway Gazette, in its issue of January 18, commenced publication of the eight pages which it plans to devote each week to technical subjects formerly covered by the Railway Engineer. The advantages of the merger, as outlined in the Gazette's announcement, "are twofold, in that a certain amount of duplication is avoided and a quicker presentation of technical and engineering articles of topical interest will be given."

Heavy Travel to Florida

The Pennsylvania reports that its records for the month of December show that nearly 10,000 passengers left New York for Florida, an increase of 20 per cent over one year ago, and a heavier movement than in any month since the so-called boom days of Florida. The total in January was about 15,000, which is 15 per cent over January 1934, and the expectation for February is a 25 per cent increase. Passengers from New England have numbered between 15 to 25 per cent more than last year. Of the Florida passengers going by the Pennsylvania, 80 per cent are destined to Miami, West Palm Beach, St. Petersburg and Tampa.

Passengers who take their automobiles are also increasing in number, and it is estimated that these cars, being sent by fast freight on tickets bought with passenger tickets, will have numbered 10,000 before the end of this season, or about five times as many as were carried last season. Seven passenger trains a day now leave the Pennsylvania station at New York for Florida.

Revision of Class Rates in Southwest Prescribed

With its twenty-first supplemental report in the Consolidated Southwestern Cases, which involved a general revision of class rates and many commodity rates in the Southwest, the Interstate Commerce Commission, following a re-opening of the case made necessary by its revisions of class rates to and from western trunk line territory, has prescribed further revisions in certain features of the scales heretofore prescribed. The report, by Commissioner Miller, is accompanied by an order prescribing maximum reasonable percentage relations of the several western, eastern, and southern classes for application from, to and within the southwestern territories, including a reduction of western fifth class from 40 per cent of first class to 37.5 per cent. Commissioner Mahaffie, dissenting, said that this is an effort to harmonize the rate structure to from and within the Southwest with that prescribed in October, 1934, for western trunk line territory and that what is done must be based, in large part, on considerations relating to territories other than the Southwest and on a record with which the parties to this proceeding had no connection. Commissioner Porter also dissented.

Passenger Traffic on Domestic Scheduled Air Lines In 1934

Domestic scheduled air lines carried 461,743 passengers in 1934, the Bureau of Air Commerce, Department of Commerce, has announced. This figure covers operations of the air lines within the borders of the United States only, and does not include extensions to other nations in the western hemisphere.

In 1933 the domestic scheduled air lines carried 493,141 passengers. Other statistics on the operation of domestic scheduled air lines in 1934 as compared with 1933 are: Air express poundage, 1934, 2-133,191; 1933, 1,510,215. Miles flown, 1934, 40,955,396; 1933, 48,771,553. Passenger miles flown, 1934, 187,858,629; 1933, 173,492,119.

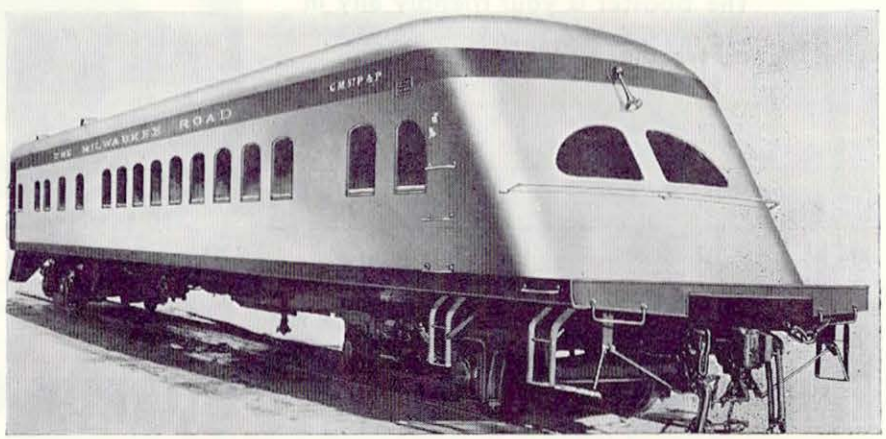
Total passengers decreased slightly in 1934 while passenger miles increased, indicating longer trips by individual passengers. In December the 22 domestic lines in operation carried 33,563 passengers, 217,852 pounds of express, flew 3,364,968 miles and 15,594,800 passenger miles. In each case the figure represented an increase over December, 1933, expect in miles flown, which showed a slight decrease.

Congressional Committees to Hold Hearings on Eastman Bills

Plans have been made for beginning Congressional consideration at an early date of the principal bills recommended by Co-ordinator Eastman in his report on transportation legislation. The House committee on interstate and foreign commerce has referred the motor carrier bill, which was introduced as H. R. 5262 by Representative Huddleston, of Alabama, to a sub-committee headed by Mr. Huddleston which plans to begin hearings on the bill on February 19. Extensive hearings on similar bills have been held before the full committee in previous years, particularly on the Rayburn bill last year. The Senate committee on interstate commerce also plans to begin hearings about February 25 on the water carrier and motor carrier bills and the bill to reorganize the Interstate Commerce Commission. The Huddleston sub-committee also includes: Representatives Bulwinkle, of North Carolina; Sadowski, of Michigan; Terry, of Arkansas; Holmes, of Massachusetts, and Wadsworth, of New York.

Milwaukee High Speed Trains

All welded, light weight, standard steel cars of the type shown in the accompanying illustration will be used in the fast trains which the Chicago, Milwaukee, St. Paul and Pacific will operate between Chicago and the Twin Cities early in the spring. The train will carry a cafe and a parlor car in addition to new type day coaches, all of which will be air-conditioned. The accompanying photograph shows one of the two rear cars now nearing completion in the company shops.



"Beaver Tail" Cars Will Be Used on the Rear of the Trains

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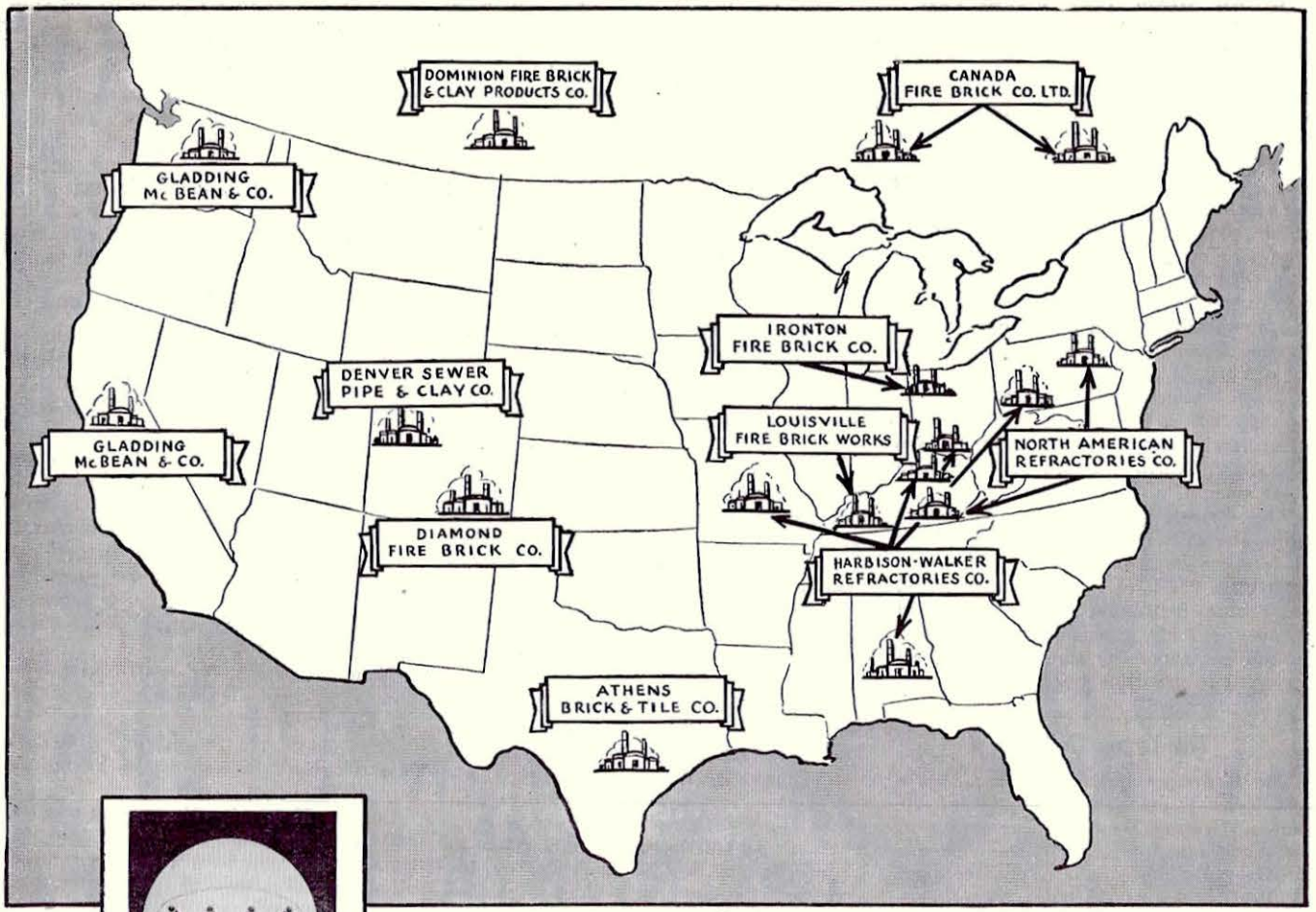
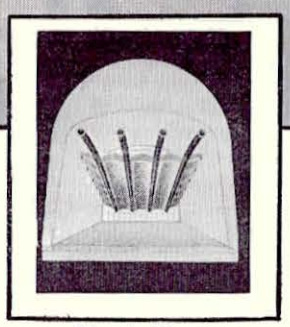

DOMINION FIRE BRICK & CLAY PRODUCTS CO.
CANADA FIRE BRICK CO. LTD.
GLADDING Mc BEAN & CO.
IRONTON FIRE BRICK CO.
DENVER SEWER PIPE & CLAY CO.
LOUISVILLE FIRE BRICK WORKS
GLADDING Mc BEAN & CO.
NORTH AMERICAN REFRACTORIES CO.
DIAMOND FIRE BRICK CO.
HARBISON-WALKER REFRACTORIES CO.
ATHENS BRICK & TILE CO.



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SECURITY ARCHES
Than Just Brick

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THE SECURITY

Service of Supply

All three factors essential for economical brick arch performance have been perfected during the quarter of a century that the Security Sectional Arch has been standard on American railroads.

First, design—small sectional brick supported on arch tubes—second, supervision of ceramic materials and—third, convenient sources of supply.

How carefully the railroad interests have been safeguarded is indicated by the sources of supply shown above, sources that not only insure prompt, convenient service but also safeguard brick quality for every railroad in the country.

AMERICAN ARCH COMPANY
INCORPORATED
Locomotive Combustion Specialists
NEW YORK CHICAGO

British Steam Train Makes Fast Run with Old Locomotive

With a regular passenger train hauled by a locomotive 27 years old the London & North Eastern of Great Britain recently achieved an average speed of 60 m.p.h. for the 185.8-mi. run from Kings Cross to Leeds. The overall time of 185 min. 40 sec. included two complete stops for adverse signals and three further signal checks en route. The net time of the run was 175 min., and over 136 mi. a net average speed of 70 m.p.h. was maintained. The run, the details of which were made public by the Associated British Railways, Inc., New York, is called in the announcement an exploit which parallels "the operations of the '400'—a 60 mile-per-hour standard steam train recently introduced by the Chicago & North Western Railway with great success."

The British announcement adds that while the railways in that country "have made some experiments with streamlined equipment, this L. N. E. achievement would prove that further acceleration of train services will not depend merely on latest locomotives types, streamlining or Diesel operation to make the gains of time effective in practice."

The Lagny Collision

The Railway Gazette (London), in recent issues prints a brief account of the trial of Georges Daubigny, engineman of the Strasbourg express of the Eastern Railway of France, which, on December 23, 1933, at Lagny, 15 miles from Paris, wrecked the train ahead of it by colliding, at very high speed, and caused the death of over 200 persons. Daubigny was arrested but was soon released, largely in response to public opinion; and pending his trial on a charge of homicide, he has been serving as engineman of slow passenger trains on the Eastern.

His trial was held at Meaux, on December 19, 20 and 21. An investigation of the circumstances of the collision was made by the government, and the investigators concluded that the signal apparatus was in proper operative condition and that the engineman must have passed a cautionary signal without seeing it; and possibly two such signals. (Trains ahead of the Strasbourg express had slackened speed because of atmospheric conditions.) The speed was so great that the engineman, according to the belief of the investigators, had missed four signals, and it is regarded as incredible that all of these should have failed for a moment and then have immediately resumed normal operation. The relays have all been taken out and tested. The defense introduced testimony concerning false clear failures of signals.

The chief engineer of roadway is said to have testified at the trial that the crocodiles (roadway contacts for cab signals) were "not very reliable," especially when a fast train makes contact for not more than one-tenth of a second; but he estimated that a failure such as would have deceived the engineman in this case could not theoretically happen more than once in a million years.

The court delivered judgment on January 24, holding the engineman not guilty. The court took due notice of the conclusion of the railroad company that the roadside signals were against the express, and of the fact that the engineman was chargeable with inattention during only about 40 seconds, but refused to adopt the conclusion that the automatic block signaling never could fail. The chances of a combination providing a failure which would excuse the engineman were extremely small; but even a slight doubt, said the court, must be decided in favor of the accused. The report in the Railway Gazette says that as a result of his acquittal, Daubigny will be restored to his former position as engineman on express trains.

The summary of the action of the court says nothing about the cab signal, but the Railway Gazette editorially holds that there is no doubt that the cab signal mechanism failed; that it recorded on the tape only twice in the 15-mile run from Paris to Lagny. The editorial, referring to the cab signal—an open-circuit mechanical contact system—mildly criticizes the French railways for not having a better system. [Open-circuit cab signals have been in use in France for over 40 years.]

P. & S. Division Announce Contest

A competition for articles on purchasing and stores department activities of the railroads has been announced by Division VI, A.A.R. The competition is open to employees of railway purchasing and stores departments, and authors of the two best papers are to be invited to the next annual meeting of the P. & S. Division to present their papers and receive special mention in the annual proceedings. While contestants may submit papers on any subject relating to the department's activities, several subjects are suggested by the division, as follows:

Handling of Material with Latest Handling Equipment—Describe equipment used and economies resulting.

Advantages of Budget Pay-Rolls and Material Purchases—Describe the advantages.

Surplus Materials—Describe methods to prevent taking into stock second-hand materials which will soon become surplus or obsolete; also method to give greater stimulus to the exchange of surplus between railroads.

Stock Books—Discuss advantages of stock books and line stock books versus stock cards.

Stock Control—Discuss factors other than stock-book data that enter into ordering of material.

Material Saving versus Pay-Roll Sav-

The Case for the Railroads

If a stronger case for the railroads has been presented in this country than was offered in Winston-Salem Tuesday night by Samuel O. Dunn, editor of *Railway Age*, it has not come to our attention.

We believe the public generally will agree with him, too, in his contention that the competitors of the railroads should be regulated by the government in the same manner that railways are regulated.

It happened that on the same day Mr. Dunn was to speak in Winston-Salem a citizen made complaint to *The Journal* that he had been crowded off a bridge at the Yadkin River on Highway No. 60 by a giant truck. There was not room on the bridge for both, due to the excessive width of the heavy load being transported by this truck on our public highways.

Fortunately no damage or injury resulted in this instance. The driver of the truck sounded a warning horn in time, and the automobile driver backed up and gave the truck right of way.

This is an impressive example of what is happening all over North Carolina every day. Our taxpayers have spent millions building highways that serve as "tracks" for a transportation system that is in direct competition with the railroads which must maintain their own tracks.

If ever there was an indefensible governmental subsidy, this is one. And it will remain indefensible so long as the governments, state and federal, fail to apply the same methods of regulation to truck and bus operators that is being applied to the railroads.

The same government that fixes rates, hours of labor and wages paid by the railroads should also fix the rates, hours of labor and wages paid by those engaged in bus and truck transportation.

Moreover, the state and federal governments ought to recognize that there never can be any such thing as fair competition in the transportation industry in this country until the bus and truck lines are required to pay their just proportion of the expense incurred in building and maintaining the highways which they use.

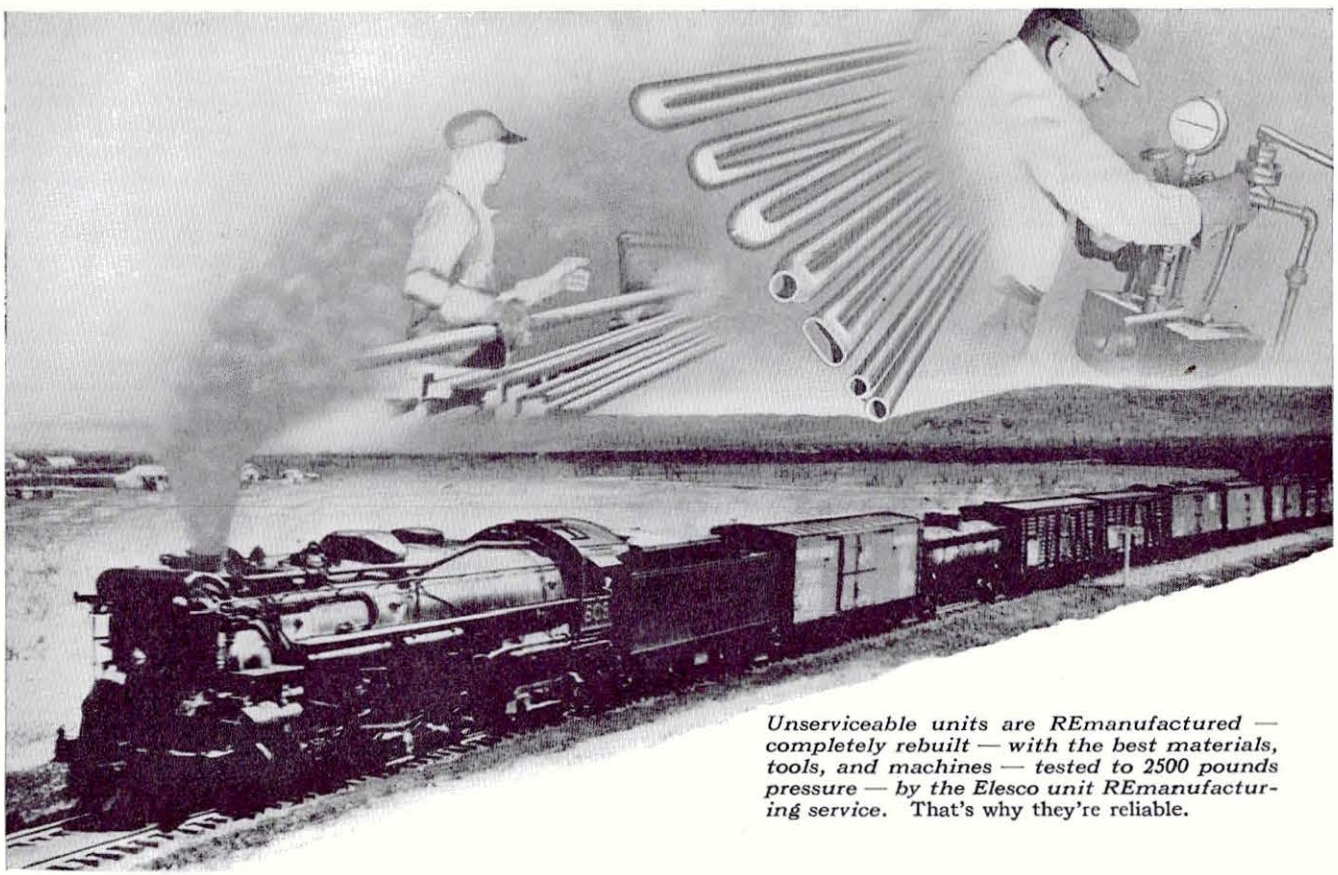
This is one of the most serious problems confronting Congress and the various state legislatures. The future of the railroads of the United States, of the public which they serve, of the vast army of men and women given employment by them directly and indirectly, and of that other great army of railway security holders depends upon the solution of this problem.

From the Winston-Salem (N. C.) Journal

Continued on next left-hand page

RELIABLE

Definition . . . *to be relied on; worthy of confidence; trustworthy.*



Unserviceable units are REmanufactured — completely rebuilt — with the best materials, tools, and machines — tested to 2500 pounds pressure — by the Elesco unit REmanufacturing service. That's why they're reliable.

So that trains may not fail in their schedules because of poorly maintained superheater equipment—use the Elesco unit REmanufacturing service for reconditioning unserviceable superheater units.

It is reliable.

ELESCO

THE SUPERHEATER COMPANY

Representative of **AMERICAN THROTTLE COMPANY, Inc.**

60 East 42nd Street
NEW YORK

NRA MEMBER U.S. WE DO OUR PART A-962

Peoples Gas Building
CHICAGO

Canada: **The Superheater Company, Limited, Montreal**

Superheaters - Feed Water Heaters - Exhaust Steam Injectors - Superheated Steam Pyrometers - American Throttles

ing—Describe methods that could be used to save money in use of material even if in some cases it does bring about slight increases in pay-roll expense.

A committee consisting of J. C. Kirk, assistant general storekeeper, Chicago, Rock Island & Pacific; G. H. Walder, purchasing agent, Chicago, Milwaukee, St. Paul & Pacific; and L. B. Wood, general storekeeper, Southern Pacific lines (Texas and Louisiana), will act as judges in selecting the two best papers.

Articles must contain at least 1,000 words and not more than 3,000, and must be in the hands of the secretary not later than April 15, 1935. Papers will be judged on the basis of 70 per cent for originality of ideas, conclusions and solutions of problems involved; 25 per cent for conciseness and clearness of expression, grammatical construction, etc.; and 5 per cent for general appearance and neatness; all papers to become the property of the division.

Equipment and Supplies

FREIGHT CARS

THE SHIPPERS' CAR LINE contemplates buying 10, 25 or 40 cars of 40 tons' capacity for transporting dry ice.

THE NORTHERN REFRIGERATOR LINE, INC., Milwaukee, Wis., has ordered 500 freight refrigerator cars from Merchants Despatch, Inc.

THE NORTH-WESTERN OF BRAZIL is inquiring for 718 cars of about 33 tons capacity, including 195 large cattle cars, 5 small cattle cars, 68 gondola, 150 flat and 300 box. H. E. Couto Fernandes is director, and the head office of the company is at Rio de Janeiro, Brazil.

THE CINCINNATI, NEW ORLEANS & TEXAS PACIFIC, reported in the *Railway Age* of January 26 as inquiring for 300 steel-sheathed, wood-lined automobile cars 40 ft. 6 in. long and of 40 tons' capacity, has ordered this equipment from the Pressed Steel Car Company.

PASSENGER CARS

THE NORFOLK SOUTHERN has ordered two special Model 60 gasoline, mechanical-drive, rail motor cars from the American Car & Foundry Company.

IRON AND STEEL

NEW YORK CENTRAL.—A contract for 1,500 tons of steel has been let to the American Bridge Company by the P. T. Cox Contracting Company, who has the contract for West Side improvements between Forty-second and Fifty-third streets, New York. Another contract for 8,000 tons of structural steel, 4000 tons of which will be fabricated by the American Bridge Company, has been let to the Harris Structural Steel Company, New York, by the Poirier & McLane Corporation, New York, which latter has the contract for the West Side improvements between Seventy-second and Seventy-sixth streets, New York.

MACHINERY AND TOOLS

THE DELAWARE, LACKAWANNA & WESTERN will shortly purchase new shop machinery and equipment to augment existing facilities and to replace obsolete equipment. The company is now asking for prices on the following equipment:

1 36-in. turret lathe
1 portable heavy-duty, geared head lathe
1 heavy-duty, geared head, lead screw cutting engine lathe
3 portable electric welding sets
2 industrial trucks
1 electric metal melting pot
1 2-ton electric hoist

Construction

New York State Grade Crossing Elimination

The New York Public Service Commission has ordered eight railroads to show cause at public hearings to be held at Albany, February 18-21 inclusive, why they should not proceed with the elimination of the most dangerous grade crossings that remain in New York state, involving 31 projects, some of which include more than one crossing. Orders were issued by the commission last year designating the crossings for elimination and directing the railroads involved to proceed with the preparation of plans, specifications and estimates of cost and to carry out the work. The crossings on the New York Central are located at Yonkers (2), Mt. Pleasant, Bedford, Lewisboro, Tonawanda, Cheektowaga, Rochester, Churchville, Armenia, Whitestown, Little Falls, Ulster; also in connection with the Erie, the Delaware, Lackawanna & Western and the Lehigh Valley, at Depew. The crossings on the Erie are located at Lancaster, Goshen and Tonawanda, and in connection with the Delaware, Lackawanna & Western and the Lehigh Valley, at Cheektowaga. Other crossings on the Lehigh Valley are located at Rush and Newfield. The crossings on the Pennsylvania are located at Southport, Horseheads, Portville, and in connection with the New York, Chicago & St. Louis, at Hamburg. The Long Island crossings are at Oyster Bay, Farmingdale, Babylon and Smithtown. The other crossing on the Lackawanna is at Wayland. There is an additional crossing on the New York, Chicago & St. Louis at Dunkirk and one on the New York, New Haven & Hartford at Fishkill, making 14 projects in which the New York Central is involved, five on the Erie, four on the Lehigh Valley, four on the Pennsylvania, four on the Long Island, three on the Delaware, Lackawanna & Western, two on the New York, Chicago & St. Louis and one on the New York, New Haven & Hartford.

CITY OF ST. LOUIS.—Allotment of $1,103,000 to the city of St. Louis, Mo., as a loan and grant for completion of railroad approaches to the municipal bridge has been announced by Public Works Administrator Harold L. Ickes. The bridge crosses the Mississippi river between St. Louis and East St. Louis Ill. Approximately $1,400,000, advanced by the Terminal Railroad Association, already has been spent on the railroad approaches to be completed with the PWA allotment. In addition to providing for completion of the approaches the allotment includes money for installation of interlocking signal systems, reconditioning expansion joints of the bridge and improvement of tracks on the railroad deck. Work can be commenced within two months, according to the application filed by the city, and completed in eight months, providing employment on the construction site for an average of 350 men in addition to the indirect employment that will be created by furnishing materials.

NEW YORK CENTRAL.—Bids will be received until 1 p. m. February 26, for the construction of a steel and concrete bridge to span the tracks of the New York Central together with approaches and incidental work, to be carried out in eliminating the grade crossing at West One Hundred and Seventy-first street, about one-quarter mile north of High Bridge station, New York City.

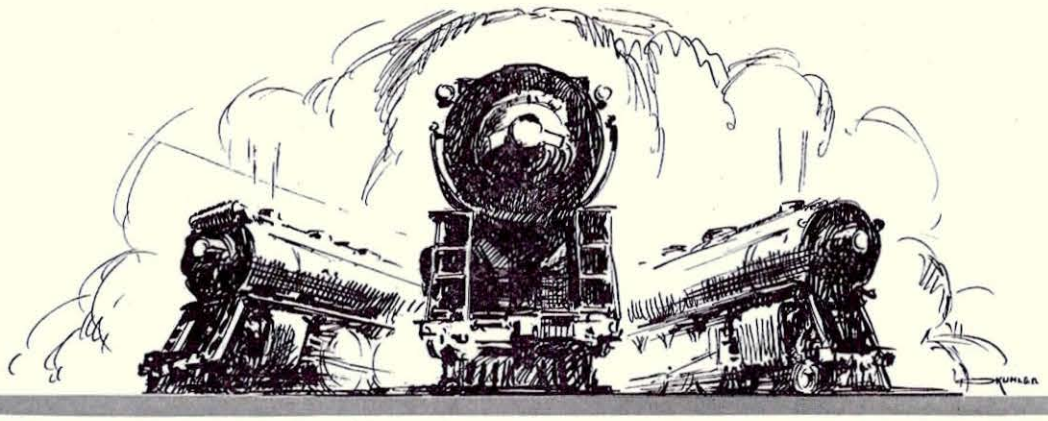
Supply Trade

The Wyoming Tie and Timber Company has purchased the Metropolis, Ill., wood preserving plant and business in treated forest products of the Joyce-Watkins Company, Chicago, and will operate the business with the same plant and field personnel under the management of **Walter H. Firmin** with headquarters at Metropolis. The Joyce-Watkins Company will continue in the business of untreated forest products.

The Youngstown Steel Door Company has acquired the railway supply business of the **Camel Company** through an issue of stock. The Camel Sales Company, which for years has been the sales agent for Youngstown steel doors and Camel door fixtures, will continue as formerly, but in addition will handle other products which the Youngstown Steel Door Company manufactures. The Camel Sales Company will maintain its present offices at 332 South Michigan avenue, Chicago, and in addition will have offices at 500 Fifth avenue, New York, and in The Arcade, Cleveland, Ohio. All of the officers of the Camel Sales Company will continue in their former capacities. **J. P. Mc Williams,** president of the Youngstown Steel Door Company has been elected president of the Camel Sales Company to succeed William W. Darrow, deceased.

Pullman-Standard Retirement Income

Retirement incomes for employees of the Pullman-Standard Car Manufacturing Company have been made possible by the adoption of a plan whereby the company and employees each contribute to a re-



AMERICAN LOCOMOTIVE CO.

THE outstanding characteristic of the modern locomotive is its hauling capacity at speed. In this regard, modern locomotives having substantially the same starting force as locomotives built 10 years ago will haul approximately twice the train-load at speeds of 30 miles per hour and up. Not only are these modern locomotives the only ones capable of maintaining high speed schedules, but they likewise are the only locomotives capable of making great monthly and annual mileages and by the intensity of their use greatly decreasing many other costs of operation . . . . .

30 CHURCH ST. NEW YORK N.Y.

serve fund. The plan, which became effective on January 1, is being underwritten by the Prudential Insurance Company of America. Prior to the recent merger of the Pullman Car & Manufacturing Corporation and the Standard Steel Car Corporation, a non-contributory pension plan had been in effect for employees of the former unit since July 1, 1914. This is now superseded by the new contributory retirement income plan, without, however, making any change in the pensions granted to retired employes prior to January 1, 1935, under the old non-contributory plan or in the pension service credits acquired up to that date by Pullman Car & Manufacturing Corporation employees.

Under the new plan, the worker will contribute two per cent of his wages to his retirement fund and the monthly benefits granted upon normal retirement will be 6¼ per cent of his total contributions; thus in sixteen months of retirement, the employee will have received a sum equivalent to the amount he has paid in, but the payments will continue as long as he lives.

Should an employe terminate his services prior to reaching retirement age—which is 70 for men and 65 for women—all the money he has paid in will be refunded to him. After twenty years or more of service, an employee who becomes unable to perform his duties will be eligible to a retirement income based on his service to the date of such disability.

General Railway Signal Company Annual Report

The General Railway Signal Company for the year ended December 31, 1934, reported a net loss of $342,151 after all charges including depreciation and amortization. This compared with a 1933 net loss of $24,120.

The report reveals that the dollar value of all orders booked during 1934 was 4.18 times that of 1933 and 61.9 per cent of the average annual bookings for the ten-year period ended with December 31, 1933. Of the 1934 orders 75 per cent were for new signaling projects and 25 per cent for repairs and renewals or practically the reverse of the previous year when 74.3 per cent of the orders were for repairs and renewals and 25.7 per cent for new projects. The dollar value of 1934 orders for new projects was 12.2 times that of 1933 and 64.1 per cent of the average annual bookings for such projects during the decade ending with 1933.

Because the greater volume of these orders for new projects—98.3 per cent—was booked in the second half of last year and thus many orders remained unfilled on December 31, the company enters 1935 "with a sizable volume of business, the dollar value of unfilled orders on hand as of January 1, 1935, being 33.5 times that on hand January 1, 1934, and 116 per cent of the average dollar value of unfilled orders on hand on the same date for the ten prior years ending December 31, 1933." Despite this set-up, however, President W. W. Salmon, in commenting on prospects for the future said that "in view of what your Company's management regards as uncertainties respecting early future railway earnings, the volume of which will influence railway purchases of our devices and systems, it does not feel warranted in making a forecast as to prospects for additional business during the year 1935."

During 1934 the company paid the regular 6 per cent dividend on its preferred stock and $1 per share on its common stock. The current position as shown by the balance sheet remains unusually strong with total current assets of $4,403,992, including $1,298,648 in cash, as against total current liabilities of $217,545. The profit and loss and surplus account for the year ending December 31, 1934, are shown in the accompanying table.

General Railway Signal Company

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED DECEMBER 31, 1934

Gross Operating Profit, before Maintenance, Repairs and Depreciation		$ 526,179
Deduct:		
Maintenance and Repairs	$ 34,248	
Depreciation of Buildings, Machinery and Operating Equipment	91,059	
Amortization of Patents and Development	198,528	
Selling, General and Administrative Expenses	645,134	
Capital Stock and Franchise Taxes	25,867	
		994,836
Net Operating Loss		468,657
Loss on Sales of Marketable Securities	80,275	
Less Appropriated from Reserve	80,275	
		.....
		468,657
Interest, Dividends and Sundry Receipts (Net)	89,881	
Profit on Temporary Investments in U. S. Treasury Notes	36,625	
		126,506
Net Loss for Year		$ 342,151
SURPLUS ACCOUNT		
Earned Surplus:		
Earned Surplus as at December 31, 1933		$1,931,870
Net Loss for Year ended December 31, 1934	$342,151	
Additional provision for Federal and State Taxes of Prior Years	27,311	
		369,461
		1,562,409
Dividends paid, less dividends on Treasury Stock:		
Preferred—6%	138,228	
Common—$1.00 per share	320,700	
		458,928
Earned Surplus as at December 31, 1934		1,103,481
Paid-In Surplus (no change during year)		1,734,451
Total Surplus, December 31, 1934		$2,837,932

Financial

BALTIMORE & OHIO.—*Abandonment.*—The Interstate Commerce Commission has authorized this company and the Toledo & Cincinnati to abandon a portion of the Middletown branch of the latter company between Hamilton, Ohio, and a point west of Woodsdale Junction, 3.6 miles.

BALTIMORE & OHIO.—*Abandonment.*—The Interstate Commerce Commission has authorized this company and the Baltimore & Ohio in Pennsylvania to abandon short segments of branch lines as follows: 1.7 miles of the Niver branch, Somerset County, Pa.; 1.8 miles of the Hickman Run branch, Fayette County; ¼ mile of the Grassy Run branch, Somerset County.

BALTIMORE & OHIO.—*Abandonment.*—The Interstate Commerce Commission has authorized this company and subsidiaries to abandon four short segments of line as follows: 4,245 ft. of the Beaver Dam branch of the Midvale branch, Ohio; Portsmouth branch between Welleston, Ohio, and Roads, 2.1 miles; 3,321 ft. of Superior No. 10 branch of its Buckeye branch, Ohio; and 2.8 miles of the Belington & Northern line in Barbour County, W. Va.

MISSOURI PACIFIC.—*Reorganization.*—O. P. Van Sweringen, chairman of the board, has been in Washington conferring with Chairman Jones of the Reconstruction Finance Corporation regarding a proposed plan of reorganization which contemplates a loan from the R. F. C. It was stated that the discussions are still in a tentative stage.

MOREHEAD & NORTH FORK.—*Stock.*—The Interstate Commerce Commission has authorized the Morehead & North Fork Railway Company to issue $100,000 of capital stock to be applied in payment of the purchase price of the railroad of the Morehead & North Fork Railroad Company which was acquired by the present company at a foreclosure sale held on June 4, 1934.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon operation of a branch line between De Rossett, Tenn., and Clifty, 7.67 miles.

Average Prices of Stocks and of Bonds

	Feb. 13	Last week	Last year
Average price of 20 representative railway stocks..	32.95	32.42	47.69
Average price of 20 representative railway bonds..	75.79	75.89	76.65

Dividends Declared

Boston & Albany.—$2.00, payable March 30 to holders of record February 28.

Cincinnati, New Orleans & Texas Pacific.—5 per cent Preferred, $1.25, quarterly, payable March 1 to holders of record February 15.

Green Bay & Western.—$1.00; Debenture A, $25.00 on each $1,000 debenture; both payable February 11 to holders of record February 8.

Pittsburgh, Youngstown & Ashtabula.—Preferred, $1.75, quarterly, payable March 1 to holders of record February 20.

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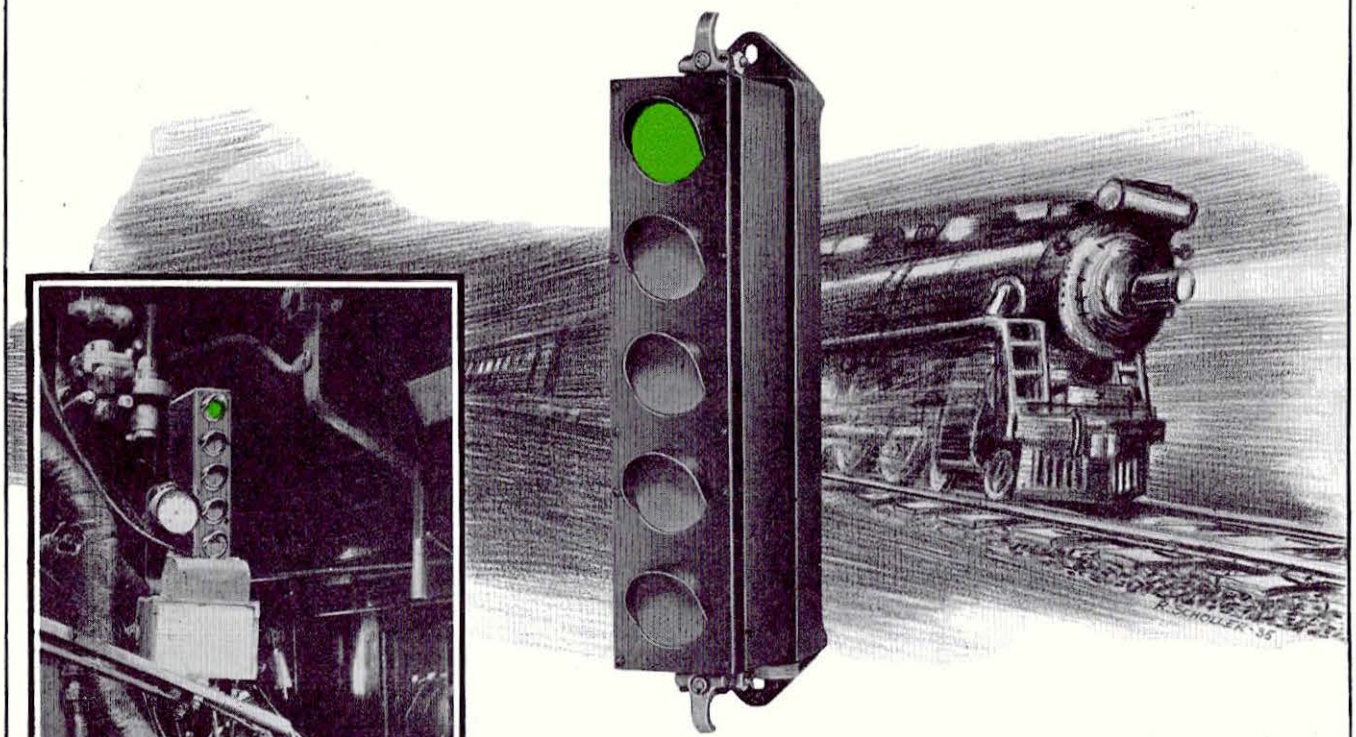
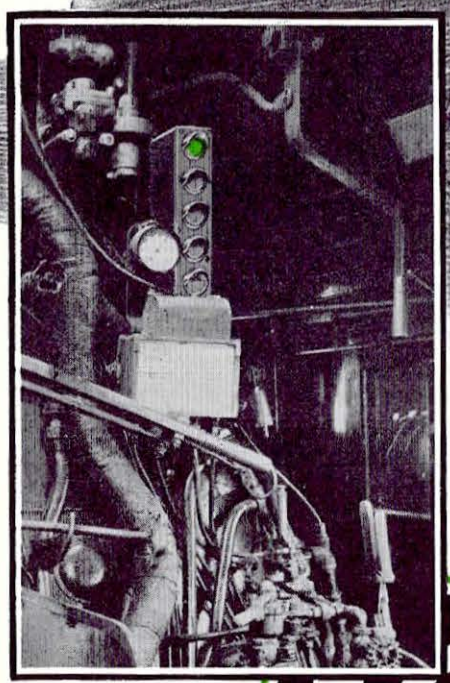




You may have a similar situation—

Single track. Train operation by time-table and train-orders only. No automatic signals. Territory frequently covered with dense fogs. Expense of construction of second track not justified by volume of business available. » » » »

Such a situation was solved on one railroad by installation of "Union" Coded Continuous Cab Signals of the three-block indication type. » » » » » » » »

Result: Safer operation; greater speed; an increase in track capacity sufficient indefinitely to postpone second tracking; maintenance of schedules; customer good-will; economy!

Our nearest district office will gladly furnish details of this installation and the many benefits to be derived from installation of "Union" Coded Continuous Cab Signals. No obligation.

873

1881 **Union Switch & Signal Co.** 1935

SWISSVALE, PA.

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

Railway Officers

FINANCIAL, LEGAL AND ACCOUNTING

Thomas Bird, assistant treasurer of the Cincinnati, New Orleans & Texas Pacific, the Harriman & Northeastern and the Cincinnati, Burnside & Cumberland River (parts of the Southern System), has been appointed treasurer, with headquarters as before at Cincinnati, Ohio. **C. J. Boos,** assistant cashier and paymaster of these lines, has been appointed assistant treasurer and paymaster, with headquarters at Cincinnati.

OPERATING

J. J. Ryan, yardmaster on the Chicago, Burlington & Quincy at St. Louis, Mo., has been promoted to trainmaster at St. Joseph, Mo., succeeding **J. E. Thiehoff,** who has been appointed assistant superintendent at Sterling, Colo., as noted in the *Railway Age* of February 2.

TRAFFIC

Henry J. Dentzman, assistant general freight agent of the Chicago & Eastern Illinois, who has been promoted to general freight agent as noted in the *Railway Age* of February 2, was born on September 12, 1885, at Chicago. He entered railway service in December, 1902, with the Pennsylvania, serving with this railroad until 1907. In that year he went with the C. & E. I., and after two years he entered the

Henry J. Dentzman

service of Swift & Company at Chicago where he remained until April, 1913. He then served as traffic manager of J. Friedheim & Company and the Duntley Vacuum Cleaner Company. Mr. Dentzman returned to the C. & E. I. on October 25, 1914, as a tariff inspector, being promoted to chief clerk in the traffic department in September, 1917. During the World War he served with the United States Army overseas as a second lieutenant of engineers, returning to the C. & E. I. in June, 1919, as division freight agent at Salem, Ill. He was appointed general agent at St. Louis on November 21, 1922, and was further advanced to assistant general freight agent at that point in August, 1925. In his new position as general freight agent, Mr. Dentzman remains at St. Louis.

D. M. Spangler, traveling freight agent for the Atchison, Topeka & Santa Fe at Indianapolis, Ind., has been promoted to general agent, at Des Moines, Iowa, succeeding **J. C. Batham,** who has been transferred to Minneapolis, Minn., succeeding **E. L. Jansen,** deceased.

N. E. Goldenbogen, general agent of the Wheeling & Lake Erie and the Lorain & West Virginia at Cleveland, Ohio, has been appointed general coal freight agent, with the same headquarters. **E. F. Torgler** has been appointed general agent at Cleveland, succeeding Mr. Goldenbogen. **T. A. Weybrecht,** general agent at New York, has been appointed chief of traffic bureau, with headquarters at Cleveland, succeeding **H. J. Adell,** resigned. **S. H. Denney,** general agent at Philadelphia, Pa., has been transferred to New York, succeeding Mr. Weybrecht. **J. M. Thistle** has been appointed general agent at Philadelphia, succeeding Mr. Denney.

MECHANICAL

Walter M. English, acting superintendent of motive power of the Chicago, Indianapolis & Louisville, who has been appointed superintendent of motive power, with headquarters as before at Lafayette, Ind., has been connected with the Monon continuously for more than 20 years. He was born on February 25, 1891, at Danville, Ill., and was educated at Purdue university, from which he obtained the degree of Bachelor of Science in Mechanical Engineering in 1913, and the degree of Mechanical Engineer in 1917. He entered the service of the Monon on September 10, 1914, as a special apprentice at Lafay-

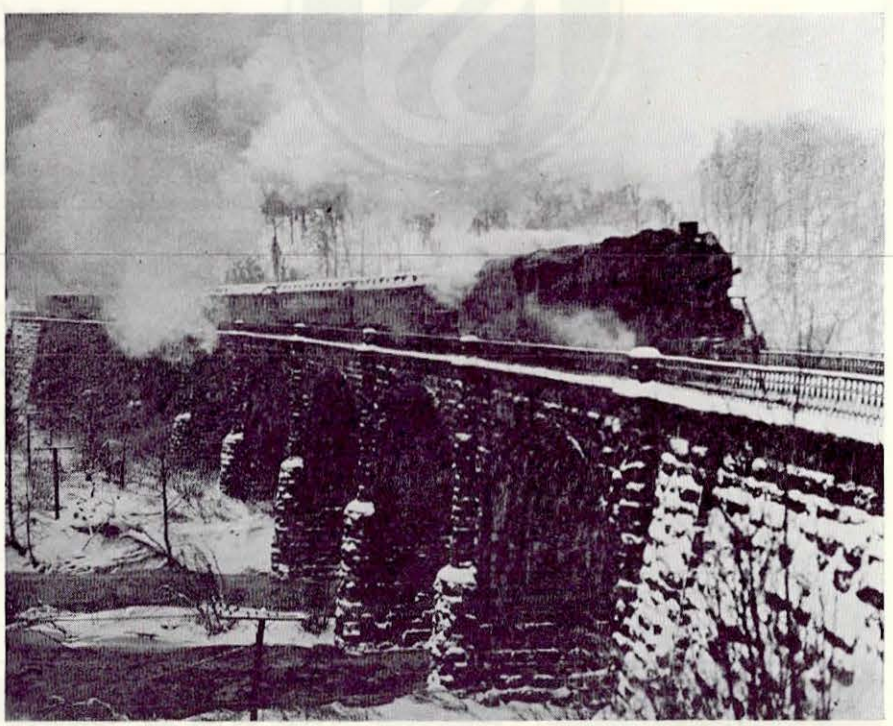
Walter M. English

ette, being promoted to mechanical inspector on March 1, 1916. On October 1 of the following year Mr. English was further advanced to master mechanic of the Northern division, with headquarters at Lafayette. On July 15, 1933, he was made acting superintendent of motive power.

OBITUARY

Charles H. Van Why, former general locomotive inspector of the Central of New Jersey, died on February 13 at his home in Roselle, N. J., at 78 years of age. Mr. Van Why retired in 1928.

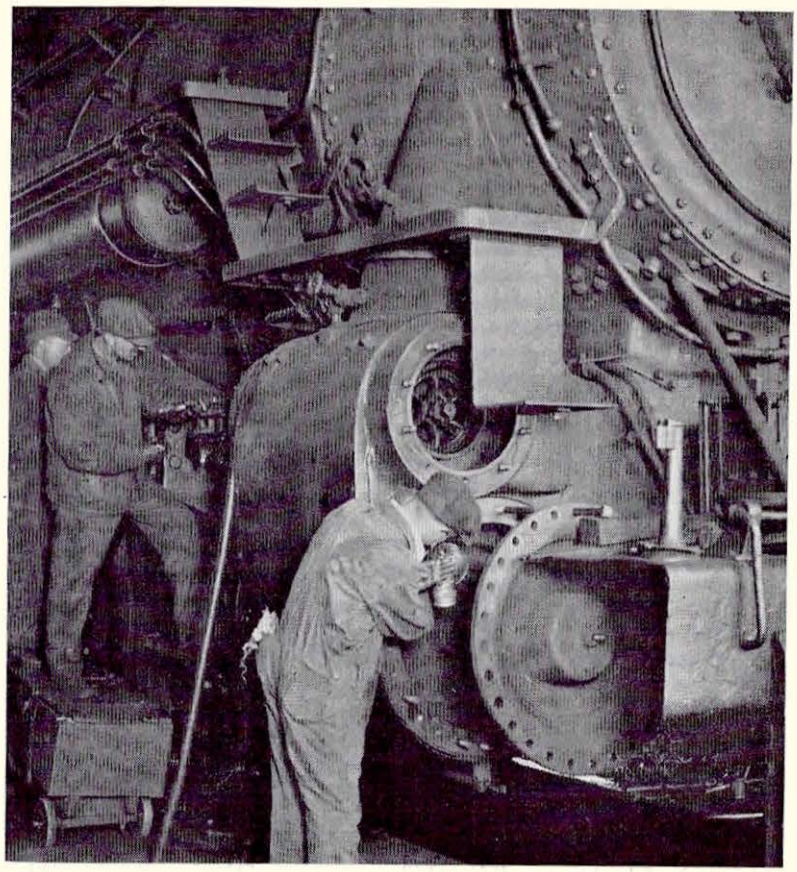
* * * *



The Baltimore & Ohio's "Columbian," En Route from Washington, D. C., to New York, Passing Over the Thomas Viaduct at Rely, Md., During a Recent Heavy Snowfall. This Viaduct, Which Will Be 100 Years Old Next July, Is the Oldest Curved Stone-Arch Railroad Bridge in the World.

Table of Operating Statistics of Railways begins on next left-hand page

HSGI SERVICE
The Best Proof of QUALITY



SERVICE which insures maximum mileage between renewals of parts regardless of the increases in frictional stresses and temperatures - - this is the service built into HUNT-SPILLER *Air Furnace* GUN IRON.

This service has proved to be a dominant factor in the promotion of locomotive efficiency - - reduction of failures - - elimination of many running repair items - - decrease in fuel consumption and lowering of maintenance costs.

Take advantage of the economies offered by this service. Equip your locomotives with the complete line of H S G I parts listed below.

H S G I
Reg. U. S. Trade Mark

Cylinder Bushings
Cylinder Packing Rings
Pistons or Piston Bull Rings
Valve Bushings
Valve Packing Rings
Valve Bull Rings
Crosshead Shoes
Hub Liners
Shoes and Wedges
Floating Rod Bushings

Parts Finished For Application

Dunbar Sectional Type Packing
Duplex Sectional Type Packing for Cylinders and Valves
(Duplex Springs for Above Sectional Packing)
Cylinder Snap Rings
Valve Rings All Shapes

HUNT-SPILLER MFG. CORPORATION
J. G. Platt, Pres. & Gen. Mgr. — V. W. Ellet, Vice-President

Office & Works
383 Dorchester Ave. South Boston, 27, Mass.

Canadian Representative: Joseph Robb & Co., Ltd., 70 North Bank Rd., Montreal, P. Q.
Export Agent for Latin America:
International Rwy. Supply Co., 30 Church Street, New York, N. Y.

HUNT-SPILLER *Air Furnace* GUN IRON

Freight Operating Statistics of Large Steam Railways—Selected Items for the Month of November,

Region, road, and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross Excluding locomotives and tenders	Ton-miles (thousands): Net Revenue and non-revenue	Average number of locomotives on line: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany....1934	402	116,567	120,579	8,028	2,856	67.2	149,759	50,774	52	44	45.4	15
1933	402	127,283	131,815	8,556	3,115	66.7	162,890	54,838	64	40	38.6	18
Boston & Maine....1934	2,016	252,482	279,722	27,274	8,313	66.7	464,366	173,037	107	175	62.2	4
1933	2,059	260,565	297,541	27,976	8,534	65.5	483,074	175,602	135	153	53.1	13
N. Y., New H. & Hartf....1934	2,049	328,900	402,714	19,368	10,314	65.5	568,594	211,796	225	132	36.9	42
1933	2,044	324,243	396,906	21,323	10,447	65.0	573,516	212,725	207	156	42.9	21
Great Lakes Region:												
Delaware & Hudson....1934	848	198,489	264,662	30,277	6,445	59.5	418,471	189,875	247	28	10.1	155
1933	848	211,074	281,203	31,943	6,834	60.8	438,742	201,626	248	29	10.4	141
Del., Lack. & Western....1934	992	324,643	360,435	45,971	10,117	66.5	582,672	226,022	168	91	35.2	33
1933	998	343,147	379,383	48,188	10,585	65.0	622,221	243,560	192	64	25.1	51
Erie (incl. Chi. & Erie)....1934	2,304	621,989	651,494	42,236	25,102	61.9	1,560,219	572,734	313	175	35.9	96
1933	2,316	645,409	670,289	58,732	25,444	61.4	1,581,779	586,870	313	178	36.2	88
Grand Trunk Western....1934	1,007	172,416	174,082	1,986	4,256	58.9	264,178	90,331	63	75	54.3	..
1933	1,008	193,342	194,063	1,393	4,299	60.8	260,050	89,626	73	75	50.3	2
Lehigh Valley....1934	1,335	366,467	384,949	33,642	10,535	63.1	662,928	268,878	191	119	38.4	29
1933	1,335	379,026	397,826	38,774	10,839	62.2	677,548	273,841	170	150	46.7	9
Michigan Central....1934	1,961	329,840	331,451	9,083	9,723	59.6	595,469	205,595	139	46	24.7	43
1933	1,957	329,694	330,726	12,160	9,938	60.7*	587,935	198,718	132	55	29.4	34
New York Central....1934	6,408	1,377,895	1,465,227	104,293	47,302	58.7	3,102,743	1,276,977	552	548	49.8	52
1933	6,411	1,427,808	1,529,451	105,173	50,023	58.5	3,225,609	1,306,238	561	612	52.2	21
New York, Chi. & St. L....1934	1,661	429,379	430,987	4,047	13,344	60.8	803,063	283,706	135	49	26.8	37
1933	1,660	469,669	485,192	4,943	13,298	60.0	803,589	280,074	132	63	32.4	16
Pere Marquette....1934	2,189	300,851	310,648	3,358	6,975	59.1	455,384	175,514	110	43	28.2	13
1933	2,254	298,968	308,865	2,801	6,389	57.2	428,527	164,953	116	56	32.5	22
Pitts. & Lake Erie....1934	234	61,534	63,876	....	2,393	54.0	205,134	108,753	42	30	42.0	20
1933	229	68,672	70,329	1,281	2,494	54.5	212,486	114,505	29	41	59.0	2
Wabash....1934	2,435	498,552	507,374	10,331	14,379	62.8	846,590	283,161	166	164	49.7	38
1933	2,445	505,761	512,057	9,976	14,358	61.9	850,841	259,851	168	172	50.5	60
Central Eastern Region:												
Baltimore & Ohio....1934	6,322	1,240,787	1,493,127	155,790	35,421	58.4	2,453,214	1,060,082	776	544	41.2	215
1933	6,282	1,309,640	1,597,482	176,680	36,497	57.8	2,584,519	1,138,687	709	614	46.4	87
Big Four Lines....1934	2,655	540,047	556,296	23,877	15,250	59.0	1,010,455	442,877	186	184	49.7	6
1933	2,660	553,571	566,273	20,462	15,516	60.4	991,868	427,250	231	163	41.4	20
Central of New Jersey....1934	690	131,029	144,886	24,707	4,190	57.3	294,046	135,197	72	92	56.0	18
1933	692	134,217	149,495	25,797	4,187	55.9	296,997	136,840	104	68	39.8	41
Chicago & Eastern Ill....1934	939	163,826	164,223	2,577	3,503	61.2	237,452	103,133	51	60	54.0	6
1933	939	175,310	175,623	2,773	3,623	59.1	251,469	108,817	61	110	64.4	14
Elgin, Joliet & Eastern....1934	446	73,327	74,472	748	1,569	57.5	126,842	61,057	63	25	28.9	15
1933	446	75,331	76,339	1,413	1,524	56.3	124,360	59,308	67	22	24.6	16
Long Island....1934	396	28,910	29,813	13,118	304	53.8	22,434	9,676	36	26	41.9	4
1933	396	29,459	30,346	13,679	289	53.0	21,924	8,716	35	22	38.6	..
Pennsylvania System....1934	9,998	2,381,881	2,654,092	298,012	81,208	60.7	5,534,540	2,455,835	1,428	1,008	41.4	318
1933	10,082	2,521,000	2,810,526	295,471	85,311	61.4	5,730,573	2,516,714	1,510	918	37.8	368
Reading....1934	1,454	378,228	409,594	44,871	10,570	58.5	778,775	371,534	266	104	28.1	77
1933	1,454	387,151	420,566	42,427	10,259	57.5	762,557	359,036	255	117	31.6	81
Pocahontas Region:												
Chesapeake & Ohio....1934	3,104	793,134	833,657	34,607	32,960	52.9	2,881,786	1,526,321	427	111	20.6	107
1933	3,122	790,957	838,514	35,543	33,174	54.8	2,851,510	1,531,011	462	212	31.5	137
Norfolk & Western....1934	2,162	537,995	559,228	24,896	20,447	58.8	1,649,734	857,796	379	40	9.5	148
1933	2,163	533,707	553,267	24,207	19,214	58.4	1,614,737	844,047	412	56	12.0	178
Southern Region:												
Atlantic Coast Line....1934	5,148	514,535	515,414	6,916	10,217	60.6	554,250	185,121	294	154	34.3	74
1933	5,144	521,125	523,274	6,176	10,111	60.2	558,291	190,840	356	126	26.1	125
Central of Georgia....1934	1,886	216,072	217,738	3,303	4,665	68.7	256,868	98,373	97	44	31.1	..
1933	1,886	195,493	196,321	3,347	4,066	68.7	217,200	80,464	104	38	26.6	..
Ill. Cent. (incl. Y. & M. V.)....1934	6,580	1,338,532	1,345,157	25,588	30,107	59.3	2,007,931	810,420	598	329	35.5	19
1933	6,640	1,273,419	1,285,793	21,962	27,975	57.2	1,917,328	765,131	593	337	36.3	6
Louisville & Nashville....1934	5,049	933,071	999,863	24,582	20,251	58.6	1,408,032	659,129	324	297	47.8	17
1933	5,112	882,714	946,305	26,303	18,946	58.3	1,336,996	629,586	326	311	48.9	23
Seaboard Air Line....1934	4,295	439,635	448,522	4,112	10,432	64.6	594,278	213,175	182	91	33.3	14
1933	4,298	429,110	434,960	4,113	10,018	64.9	579,244	212,849	219	70	24.2	25
Southern....1934	6,599	1,066,656	1,082,426	17,642	23,738	63.9	1,350,265	508,663	565	285	33.5	90
1933	6,602	1,035,107	1,050,481	16,887	22,630	63.8	1,281,322	477,688	684	230	25.1	173
Northwestern Region:												
Chi. & North Western....1934	8,443	862,749	900,777	19,786	21,299	61.2	1,311,527	426,812	568	260	31.4	198
1933	8,425	914,780	966,019	22,839	21,933	62.5	1,351,289	460,613	578	236	28.9	148
Chicago Great Western....1934	1,463	228,557	229,862	11,912	6,401	57.6	408,113	139,024	66	35	34.2	7
1933	1,463	215,830	217,328	19,892	6,173	56.0	399,184	132,308	64	35	35.4	2
Chi., Milw., St. P. & Pac...1934	11,168	1,161,954	1,215,446	51,632	28,899	59.3	1,830,519	700,892	501	324	39.3	125
1933	11,195	1,114,052	1,170,711	48,311	27,706	59.4	1,778,855	703,875	574	306	34.8	209
Chi., St. P., Minneap. & Om....1934	1,644	195,144	201,071	8,977	3,964	63.7	239,694	90,074	116	41	26.2	57
1933	1,653	192,840	199,856	8,627	3,838	64.3	233,844	97,366	124	33	21.2	58
Great Northern....1934	8,302	724,517	731,707	22,936	22,242	61.6	1,393,030	545,367	435	168	27.9	67
1933	8,424	633,937	639,712	20,160	18,601	65.4	1,148,962	485,652	465	153	24.7	111
Minneap., St. P. & S. St. M..1934	4,274	345,133	348,788	1,881	7,211	61.6	409,110	152,785	119	39	24.7	..
1933	4,281	316,711	322,079	1,576	6,156	64.0	352,134	140,232	125	39	23.9	11
Northern Pacific....1934	6,412	600,461	652,723	42,924	18,058	63.7	1,082,652	428,936	349	104	23.0	20
1933	6,414	532,467	570,708	35,141	15,277	66.1	917,297	386,734	353	165	31.9	30
Oreg.-Wash. R. R. & Nav..1934	2,118	162,440	168,739	9,707	3,794	66.5	221,012	83,005	93	36	27.9	21
1933	2,133	144,696	150,098	8,769	3,573	69.9	200,144	78,838	75	50	40.4	14
Central Western Region:												
Alton....1934	921	172,428	174,747	1,076	3,452	58.2	224,858	75,803	54	38	41.5	6
1933	947	178,828	185,034	1,174	3,565	56.8	234,819	80,584	43	49	53.0	1
Atch., Top. & S. Fe (incl. P. & S. F.)....1934	11,391	1,383,992	1,448,630	56,126	36,061	60.6	2,231,371	709,777	566	324	36.4	112
1933	11,558	1,398,939	1,503,450	67,758	38,404	60.3	2,427,270	768,943	644	287	30.8	173
Chi., Burl. & Quincy....1934	8,950	1,153,588	1,208,539	40,305	28,230	59.3	1,736,157	713,233	470	101	17.7	3
1933	9,093	1,135,753	1,187,517	37,214	28,742	59.7	1,793,394	760,145	456	106	18.9	7
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)....1934	8,298	960,615	970,203	4,933	19,692	59.8	1,208,909	439,929	382	265	41.0	84
1933	8,333	973,886	987,857	5,036	20,591	59.2	1,280,534	464,267	443	157	26.2	101
Denver & R. G. Wn....1934	2,636	261,628	286,817	29,950	6,751	63.0	398,358	152,006	173	44	20.3	14
1933	2,471	248,774	275,353	31,413	6,893	60.1	426,334	160,307	193	43	18.2	26
Los Angeles & Salt Lake...1934	1,224	159,214	178,561	24,335	4,270	57.5	266,373	93,816	71	28	28.1	7
1933	1,232	166,994	191,003	27,374	4,846	62.2	282,814	102,295	67	42	38.5	3
Oregon Short Line....1934	2,470	289,071	301,701	20,768	7,451	58.7	468,313	160,416	134	50	27.1	26
1933	2,454	304,272	313,635	20,507	7,599	61.9	476,199	180,084	149	58	27.8	25
Southern Pacific-Pacific Lines....1934	8,598	1,021,255	1,104,407	111,248	32,994	62.0	2,036,243	673,514	541	290	34.9	171
1933	8,836	1,047,528	1,126,812	117,803	32,702	60.2	2,054,454	653,505	516	386	42.8	136
Union Pacific....1934	3,768	955,456	974,093	38,471	30,771	59.2	1,916,979	616,313	316	99	23.8	61
1933	3,768	952,900	973,819	37,145	31,841	59.1	1,997,113	637,812	346	104	23.1	95
Southwestern Region:												
Gulf, Colo. & S. Fe....1934	1,906	173,627	175,418	2,416	4,516	67.8	264,847	104,989	86	40	31.7	22
1933	1,916	177,732	182,378	3,757	4,636	64.1	289,500	118,556	85	38	30.6	18
Mo.-Kans.-Texas Lines....1934	3,282	337,951	339,912	4,696	8,218	61.4	498,867	175,113	112	84	43.1	32
1933	3,282	362,349	365,076	5,101	9,408	60.4	575,879	209,920	162	69	30.0	72
Missouri Pacific....1934	7,330	1,024,312	1,046,824	23,756	25,946	60.2	1,656,534	616,113	397	159	28.6	124
1933	7,373	1,049,385	1,065,903	23,000	26,121	60.2	1,665,908	627,873	395	166	29.7	116
St. Louis-San Francisco....1934	5,035	617,512	622,578	7,779	12,606	61.8	777,017	299,220	385	80	17.3	123
1933	5,173	604,395	609,901	6,276	13,215	60.0	822,934	319,247	397	87	18.0	138
St. Louis Southwestern Lines....1934	1,798	196,187	199,361	2,488	4,546	62.9	265,031	93,825	91	31	25.3	13
1933	1,872	200,547	207,451	2,623	4,526	65.7	257,392	93,821	96	35	26.4	18
Texas & New Orleans....1934	4,439	486,005	486,050	5,369	10,600	62.5	636,776	233,471	240	62	20.4	60
1933	4,474	465,659	465,678	5,015	9,791	63.1	584,488	213,834	220	90	29.1	42
Texas & Pacific....1934	1,945	224,435	224,435	1,287	6,625	63.9	395,491	143,094	152	77	33.8	71
1933	1,946	221,589	221,589	1,297	6,711	64.1	403,319	147,438	168	67	28.4	80

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

1934, Compared with November, 1933, for Roads with Annual Operating Revenues Above $25,000,000

Region, road, and year	Average number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
New England Region:													
Boston & Albany 1934	3,054	3,569	6,623	25.4	21,592	1,285	436	17.8	256	21.4	4,213	156	44.9
1933	3,656	3,349	7,005	28.4	21,765	1,280	431	17.6	261	22.2	4,550	160	45.2
Boston & Maine 1934	8,759	6,566	15,325	14.4	25,626	1,839	685	20.8	376	27.1	2,861	109	36.4
1933	8,957	7,366	16,323	16.1	26,415	1,854	674	20.6	359	26.6	2,843	110	37.7
N. Y., New H. & Hartf. 1934	16,305	10,392	26,697	13.3	25,491	1,729	644	20.5	264	19.7	3,445	108	39.5
1933	15,816	10,021	25,837	11.7	25,949	1,769	656	20.4	274	20.7	3,469	115	38.5
Great Lakes Region:													
Delaware & Hudson 1934	10,998	2,620	13,618	4.5	28,555	2,108	957	29.4	465	26.5	7,461	110	35.8
1933	11,128	2,641	13,769	4.4	26,072	2,079	955	29.5	488	27.2	7,924	119	37.8
Del., Lack. & Western 1934	16,866	4,146	21,012	13.1	29,023	1,795	696	22.3	359	24.1	7,596	153	52.2
1933	17,444	4,615	22,059	12.8	26,363	1,813	710	23.0	368	24.6	8,134	154	55.7
Erie (incl. Chi. & Erie) 1934	27,860	11,981	39,841	6.9	41,679	2,508	921	22.8	479	33.9	8,286	102	47.4
1933	33,002	11,760	44,762	4.9	38,889	2,451	909	23.1	437	30.9	8,446	110	49.5
Grand Trunk Western 1934	4,850	5,646	10,496	17.6	27,478	1,532	524	21.2	287	23.0	2,991	109	42.4
1933	6,113	7,570	13,683	20.7	24,847	1,345	464	20.8	218	17.2	2,963	125	44.1
Lehigh Valley 1934	17,729	5,021	22,750	26.5	31,995	1,809	734	25.5	394	24.4	6,715	146	45.0
1933	18,205	5,359	23,564	18.7	31,052	1,788	722	25.3	387	24.6	6,836	147	45.5
Michigan Central 1934	19,171	17,976	37,147	14.0	32,002	1,805	623	21.1	184	14.6	3,494	114	61.3
1933	21,478	17,181	38,659	11.0	32,524	1,783	603	20.0	171	14.1	3,384	121	61.1
New York Central 1934	56,760	54,803	111,563	25.5	35,864	2,252	927	27.0	382	24.1	6,642	106	47.5
1933	66,802	59,229	126,031	23.0	35,121	2,259	915	26.1	345	22.6	6,791	110	46.5
New York, Chi. & St. L. 1934	9,130	5,730	14,860	4.8	33,698	1,870	661	21.3	636	49.2	5,695	103	78.8
1933	9,373	6,066	15,439	6.0	30,341	1,711	596	21.1	605	47.8	5,623	113	83.6
Pere Marquette 1934	12,246	4,692	16,938	3.4	25,127	1,514	583	25.2	345	23.2	2,673	104	68.2
1933	13,725	4,665	18,390	3.0	24,230	1,433	552	25.8	299	20.3	2,439	103	60.5
Pitts. & Lake Erie 1934	17,243	9,341	26,584	50.9	45,984	3,334	1,767	45.4	136	5.6	15,513	109	29.8
1933	14,439	10,643	25,082	32.0	45,239	3,094	1,667	45.9	152	6.1	16,643	110	34.0
Wabash 1934	14,681	7,691	22,372	3.0	34,657	1,698	568	19.7	422	34.1	3,877	118	52.3
1933	15,476	8,384	23,860	3.6	33,847	1,682	514	18.1	363	32.4	3,543	125	51.2
Central Eastern Region:													
Baltimore & Ohio 1934	80,853	19,058	99,911	19.5	26,086	1,977	854	29.9	354	20.2	5,590	153	41.6
1933	84,997	18,851	103,848	20.3	25,453	1,973	869	31.2	365	20.3	6,041	163	44.7
Big Four Lines 1934	15,456	22,258	37,714	15.4	31,897	1,871	820	29.0	391	22.8	5,561	119	52.3
1933	18,497	21,876	40,373	15.5	31,251	1,792	772	27.5	353	21.2	5,354	125	49.6
Central of New Jersey 1934	14,408	7,389	21,797	32.4	28,079	2,244	1,032	32.3	207	11.2	6,532	147	34.4
1933	16,951	6,771	23,722	32.1	26,841	2,213	1,020	32.7	192	10.5	6,592	149	34.0
Chicago & Eastern Ill. 1934	4,158	2,490	6,648	10.6	26,151	1,449	630	29.4	517	28.7	3,662	126	50.4
1933	5,943	2,528	8,471	21.8	25,243	1,434	621	30.0	428	24.1	3,863	129	34.7
Elgin, Joliet & Eastern 1934	8,806	2,407	11,213	16.5	16,499	1,730	833	38.9	182	8.1	4,562	122	28.5
1933	9,615	4,064	13,679	18.5	14,794	1,651	787	38.9	145	6.6	4,432	132	29.1
Long Island 1934	768	3,242	4,010	3.0	6,093	776	335	31.8	80	4.7	814	300	23.2
1933	775	3,394	4,169	1.9	5,922	744	296	30.2	70	4.4	733	308	25.7
Pennsylvania System 1934	241,842	43,354	285,196	13.5	32,636	2,324	1,031	30.2	287	15.6	8,188	126	40.4
1933	243,008	45,500	288,508	12.2	32,581	2,273	998	29.5	291	16.1	8,321	133	42.6
Reading 1934	32,702	8,285	40,987	9.1	25,647	2,059	982	35.1	302	14.7	8,520	154	41.0
1933	36,371	7,944	44,315	19.8	24,397	1,970	927	35.0	270	13.4	8,234	158	41.5
Pocahontas Region:													
Chesapeake & Ohio 1934	43,427	9,190	52,617	1.8	49,988	3,633	1,924	46.3	967	39.5	16,393	81	53.8
1933	46,070	8,929	54,999	1.9	48,775	3,605	1,936	46.2	928	36.7	16,346	84	43.2
Norfolk & Western 1934	37,100	3,750	40,850	3.2	45,900	3,066	1,594	42.0	700	28.3	13,223	111	46.5
1933	39,901	4,041	43,942	3.5	44,792	3,026	1,581	43.9	640	24.9	13,009	117	41.1
Southern Region:													
Atlantic Coast Line 1934	26,690	5,472	32,162	15.3	18,528	1,077	360	18.1	192	17.5	1,199	119	38.9
1933	27,146	5,046	32,192	26.3	18,807	1,071	366	18.9	198	17.4	1,237	123	36.6
Central of Georgia 1934	7,137	2,130	9,267	29.4	21,504	1,189	455	21.1	354	24.4	1,739	128	52.3
1933	7,364	1,953	9,317	26.4	19,965	1,111	412	19.8	288	21.2	1,422	136	46.9
Ill. Cent. (incl. Y. & M. V.) 1934	52,129	14,668	66,797	39.9	25,224	1,500	605	26.9	404	25.3	4,106	139	49.3
1933	53,120	13,459	66,579	33.6	24,280	1,506	601	27.4	383	24.5	3,841	146	46.9
Louisville & Nashville 1934	48,555	7,156	55,711	34.9	23,900	1,509	706	32.5	394	20.7	4,351	146	55.0
1933	48,848	6,294	55,142	27.1	22,613	1,515	713	33.2	381	19.7	4,105	148	50.9
Seaboard Air Line 1934	11,728	4,679	16,407	7.2	21,903	1,352	485	20.4	433	32.8	1,654	125	55.2
1933	13,279	4,294	17,573	10.0	21,747	1,350	496	21.2	404	29.3	1,651	125	50.6
Southern 1934	28,033	14,092	42,125	13.9	20,794	1,266	477	21.4	403	29.4	2,569	156	43.1
1933	32,043	17,292	49,335	21.7	20,327	1,238	461	21.1	323	23.9	2,412	158	38.9
Northwestern Region:													
Chi. & North Western 1934	44,074	19,244	63,318	14.1	23,423	1,520	495	20.0	225	18.3	1,685	133	37.0
1933	44,807	18,108	62,915	10.2	22,928	1,477	504	21.0	244	18.6	1,822	136	40.5
Chicago Great Western 1934	2,766	2,622	5,388	3.5	33,930	1,786	608	21.7	860	68.7	3,168	135	79.9
1933	3,175	2,920	6,095	6.3	33,667	1,850	613	21.4	724	60.2	3,014	147	79.7
Chi., Milw., St. P. & Pac. 1934	55,520	14,170	69,690	3.1	24,840	1,575	603	24.3	335	23.3	2,092	127	51.2
1933	58,999	13,842	72,841	4.6	24,845	1,597	632	25.4	322	21.3	2,096	130	46.2
Chi., St. P., Minneap. & Om. 1934	1,991	7,044	9,035	11.0	18,674	1,228	462	22.7	332	22.9	1,827	125	44.7
1933	2,109	6,578	8,687	12.1	17,784	1,213	505	25.4	374	22.9	1,964	128	44.2
Great Northern 1934	42,088	12,888	54,976	6.1	28,328	1,923	753	24.5	331	21.9	2,190	130	41.7
1933	43,262	11,558	54,820	5.7	27,137	1,812	766	26.1	295	17.3	1,922	134	35.6
Minneap., St. P. & S. St. M. 1934	15,092	3,349	18,441	2.8	18,476	1,185	443	21.2	277	21.2	1,192	114	74.0
1933	17,106	2,970	20,076	4.5	17,815	1,112	443	22.8	233	16.0	1,092	124	65.8
Northern Pacific 1934	34,776	5,028	39,804	10.6	27,119	1,803	714	23.8	359	23.7	2,230	160	51.1
1933	41,238	4,576	45,814	11.6	25,785	1,723	726	25.3	281	16.8	2,010	160	38.9
Oreg.-Wash. R. R. & Nav. 1934	7,325	1,831	9,156	6.7	22,477	1,361	511	21.9	302	20.8	1,306	158	46.3
1933	7,840	1,720	9,560	11.2	21,958	1,383	545	22.1	275	17.8	1,232	151	42.3
Central Western Region:													
Alton 1934	3,209	6,341	9,550	26.1	29,870	1,304	440	22.0	265	20.7	2,743	124	63.7
1933	3,108	5,802	8,910	20.2	26,620	1,313	451	22.6	301	23.5	2,836	124	67.5
Atch., Top. & S. Fe (incl. P. & S. F.) 1934	66,346	8,787	75,133	14.0	30,119	1,612	513	19.7	315	26.4	2,077	115	56.4
1933	65,593	8,612	74,205	13.4	31,707	1,735	550	20.0	345	28.6	2,218	113	56.2
Chi., Burl. & Quincy 1934	34,901	12,526	47,427	8.5	26,418	1,505	618	25.3	501	33.5	2,656	128	73.0
1933	40,102	12,964	53,066	9.5	26,639	1,579	669	26.4	477	30.2	2,786	129	72.7
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf) 1934	30,727	10,617	41,344	20.9	21,900	1,258	458	22.3	355	26.5	1,767	148	50.2
1933	35,749	10,266	46,015	21.3	22,467	1,315	477	22.5	336	25.2	1,857	149	55.2
Denver & R. G. Wn. 1934	12,760	3,611	16,371	5.3	22,498	1,523	581	22.5	310	21.8	1,922	172	48.6
1933	13,195	3,398	16,593	5.2	23,890	1,714	644	23.3	322	23.0	2,162	176	43.3
Los Angeles & Salt Lake 1934	4,583	1,005	5,588	10.0	30,607	1,673	589	22.0	560	44.3	2,556	146	68.9
1933	4,981	961	5,942	11.7	28,290	1,694	613	21.1	574	43.7	2,768	150	67.0
Oregon Short Line 1934	9,117	4,554	13,671	20.8	26,876	1,620	555	21.5	391	30.9	2,165	129	58.5
1933	9,401	4,788	14,189	19.0	24,885	1,565	592	23.7	423	28.8	2,446	130	53.9
Southern Pacific-Pacific Lines 1934	35,333	21,687	57,020	9.7	31,735	1,994	659	20.4	394	31.1	2,611	110	48.8
1933	38,609	21,520	60,129	14.2	30,619	1,961	624	20.0	362	30.1	2,465	108	46.0
Union Pacific 1934	24,531	9,387	33,918	16.5	46,075	2,006	645	20.0	606	51.1	5,452	115	81.4
1933	24,530	8,499	33,029	19.8	45,697	2,096	669	20.0	644	54.4	5,643	114	75.0
Southwestern Region:													
Gulf, Colo. & S. Fe 1934	10,350	1,754	12,104	8.6	24,320	1,525	605	23.2	289	18.3	1,836	115	47.2
1933	13,059	2,047	15,106	7.9	27,089	1,629	667	25.6	262	16.0	2,063	108	50.6
Mo.-Kans.-Texas Lines 1934	5,954	2,936	8,890	3.3	26,629	1,476	518	21.3	657	50.2	1,779	91	58.5
1933	9,587	3,216	12,803	8.1	27,450	1,589	579	22.3	547	40.6	2,132	91	53.4
Missouri Pacific 1934	21,051	18,584	39,635	4.1	28,485	1,617	601	23.7	518	36.3	2,802	129	64.2
1933	22,768	16,579	39,347	7.2	28,141	1,588	598	24.0	532	36.7	2,838	134	64.7
St. Louis-San Francisco 1934	22,512	4,302	26,814	7.7	22,721	1,258	485	23.7	372	25.4	1,981	140	45.3
1933	23,159	4,608	27,767	7.1	22,866	1,362	528	24.2	383	26.4	2,057	140	42.4
St. Louis Southwestern Lines 1934	3,601	2,527	6,128	7.3	24,131	1,351	478	20.6	510	39.3	1,739	109	55.4
1933	4,530	2,149	6,679	10.7	22,229	1,283	468	20.7	468	34.4	1,670	109	53.4
Texas & New Orleans 1934	8,329	10,530	18,859	6.9	21,542	1,310	480	22.0	413	30.0	1,753	98	54.3
1933	8,881	10,456	19,337	5.9	19,921	1,255	459	21.8	369	26.7	1,593	99	50.6
Texas & Pacific 1934	3,729	4,031	7,760	5.2	24,413	1,762	638	21.6	615	44.5	2,452	94	32.8
1933	3,975	4,677	8,652	5.1	24,330	1,820	665	22.0	568	40.3	2,526	91	31.6

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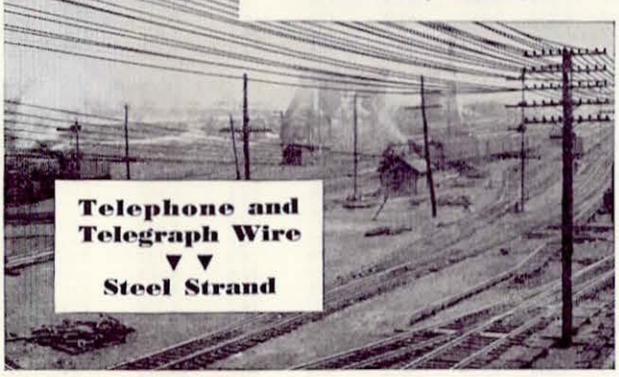

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Region, road, and year	Average number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
New England Region:													
Boston & Albany....1934	3,054	3,569	6,623	25.4	21,592	1,285	436	17.8	256	21.4	4,213	156	44.9
1933	3,656	3,349	7,005	28.4	21,765	1,280	431	17.6	261	22.2	4,550	160	45.2
Boston & Maine....1934	8,759	6,566	15,325	14.4	25,626	1,839	685	20.8	376	27.1	2,861	109	36.4
1933	8,957	7,366	16,323	16.1	26,415	1,854	674	20.6	359	26.6	2,843	110	37.7
N. Y., New H. & Hartf....1934	16,305	10,392	26,697	13.3	25,491	1,729	644	20.5	264	19.7	3,445	108	39.5
1933	15,816	10,021	25,837	11.7	25,949	1,769	656	20.4	274	20.7	3,469	115	38.5
Great Lakes Region:													
Delaware & Hudson....1934	10,998	2,620	13,618	4.5	28,555	2,108	957	29.4	465	26.5	7,461	110	35.8
1933	11,128	2,641	13,769	4.4	26,072	2,079	955	29.5	488	27.2	7,924	119	37.8
Del., Lack. & Western....1934	16,866	4,146	21,012	13.1	29,023	1,795	696	22.3	359	24.1	7,596	153	52.2
1933	17,444	4,615	22,059	12.8	26,363	1,813	710	23.0	368	24.6	8,134	154	55.7
Erie (incl. Chi. & Erie)....1934	27,860	11,981	39,841	6.9	41,679	2,508	921	22.8	479	33.9	8,286	102	47.4
1933	33,002	11,760	44,762	4.9	38,889	2,451	909	23.1	437	30.9	8,446	110	49.5
Grand Trunk Western....1934	4,850	5,646	10,496	17.6	27,478	1,532	524	21.2	287	23.0	2,991	109	42.4
1933	6,113	7,570	13,683	20.7	24,847	1,345	464	20.8	218	17.2	2,963	125	44.1
Lehigh Valley....1934	17,729	5,021	22,750	26.5	31,995	1,809	734	25.5	394	24.4	6,715	146	45.0
1933	18,205	5,359	23,564	18.7	31,052	1,788	722	25.3	387	24.6	6,836	147	45.5
Michigan Central....1934	19,171	17,976	37,147	14.0	32,002	1,805	623	21.1	184	14.6	3,494	114	61.3
1933	21,478	17,181	38,659	11.0	32,524	1,783	603	20.0	171	14.1	3,384	121	61.1
New York Central....1934	56,760	54,803	111,563	25.5	35,864	2,252	927	27.0	382	24.1	6,642	106	47.5
1933	66,802	59,229	126,031	23.0	35,121	2,259	915	26.1	345	22.6	6,791	110	46.5
New York, Chi. & St. L....1934	9,130	5,730	14,860	4.8	33,698	1,870	661	21.3	636	49.2	5,695	103	78.8
1933	9,373	6,066	15,439	6.0	30,341	1,711	596	21.1	605	47.8	5,623	113	83.6
Pere Marquette....1934	12,246	4,692	16,938	3.4	25,127	1,514	583	25.2	345	23.2	2,673	104	68.2
1933	13,725	4,665	18,390	3.0	24,230	1,433	552	25.8	299	20.3	2,439	103	60.5
Pitts. & Lake Erie....1934	17,243	9,341	26,584	50.9	45,984	3,334	1,767	45.4	136	5.6	15,513	109	29.8
1933	14,439	10,643	25,082	32.0	45,239	3,094	1,667	45.9	152	6.1	16,643	110	34.0
Wabash....1934	14,681	7,691	22,372	3.0	34,657	1,698	568	19.7	422	34.1	3,877	118	52.3
1933	15,476	8,384	23,860	3.6	33,847	1,682	514	18.1	363	32.4	3,543	125	51.2
Central Eastern Region:													
Baltimore & Ohio....1934	80,853	19,058	99,911	19.5	26,086	1,977	854	29.9	354	20.2	5,590	153	41.6
1933	84,997	18,851	103,848	20.3	25,453	1,973	869	31.2	365	20.3	6,041	163	44.7
Big Four Lines....1934	15,456	22,258	37,714	15.4	31,897	1,871	820	29.0	391	22.8	5,561	119	52.3
1933	18,497	21,876	40,373	15.5	31,251	1,792	772	27.5	353	21.2	5,354	125	49.6
Central of New Jersey....1934	14,408	7,389	21,797	32.4	28,079	2,244	1,032	32.3	207	11.2	6,532	147	34.4
1933	16,951	6,771	23,722	32.1	26,841	2,213	1,020	32.7	192	10.5	6,592	149	34.0
Chicago & Eastern Ill....1934	4,158	2,490	6,648	10.6	26,151	1,449	630	29.4	517	28.7	3,662	126	50.4
1933	5,943	2,528	8,471	21.8	25,243	1,434	621	30.0	428	24.1	3,863	129	34.7
Elgin, Joliet & Eastern....1934	8,806	2,407	11,213	16.5	16,499	1,730	833	38.9	182	8.1	4,562	122	28.5
1933	9,615	4,064	13,679	18.5	14,794	1,651	787	38.9	145	6.6	4,432	132	29.1
Long Island....1934	768	3,242	4,010	3.0	6,093	776	335	31.8	80	4.7	814	300	23.2
1933	775	3,394	4,169	1.9	5,922	744	296	30.2	70	4.4	733	308	25.7
Pennsylvania System....1934	241,842	43,354	285,196	13.5	32,636	2,324	1,031	30.2	287	15.6	8,188	126	40.4
1933	243,008	45,500	288,508	12.2	32,581	2,273	998	29.5	291	16.1	8,321	133	42.6
Reading....1934	32,702	8,285	40,987	9.1	25,647	2,059	982	35.1	302	14.7	8,520	154	41.0
1933	36,371	7,944	44,315	19.8	24,397	1,970	927	35.0	270	13.4	8,234	158	41.5
Pocahontas Region:													
Chesapeake & Ohio....1934	43,427	9,190	52,617	1.8	49,988	3,633	1,924	46.3	967	39.5	16,393	81	53.8
1933	46,070	8,929	54,999	1.9	48,775	3,605	1,936	46.2	928	36.7	16,346	84	43.2
Norfolk & Western....1934	37,100	3,750	40,850	3.2	45,900	3,066	1,594	42.0	700	28.3	13,223	111	46.5
1933	39,901	4,041	43,942	3.5	44,792	3,026	1,581	43.9	640	24.9	13,009	117	41.1
Southern Region:													
Atlantic Coast Line....1934	26,690	5,472	32,162	15.3	18,528	1,077	360	18.1	192	17.5	1,199	119	38.9
1933	27,146	5,046	32,192	26.3	18,807	1,071	366	18.9	198	17.4	1,237	123	36.6
Central of Georgia....1934	7,137	2,130	9,267	29.4	21,504	1,189	455	21.1	354	24.4	1,739	128	52.3
1933	7,364	1,953	9,317	26.4	19,965	1,111	412	19.8	288	21.2	1,422	136	46.9
Ill. Cent. (incl. Y. & M. V.)....1934	52,129	14,668	66,797	39.9	25,224	1,500	605	26.9	404	25.3	4,106	139	49.3
1933	53,120	13,459	66,579	33.6	24,280	1,506	601	27.4	383	24.5	3,841	146	46.9
Louisville & Nashville....1934	48,555	7,156	55,711	34.9	23,900	1,509	706	32.5	394	20.7	4,351	146	55.0
1933	48,848	6,294	55,142	27.1	22,613	1,515	713	33.2	381	19.7	4,105	148	50.9
Seaboard Air Line....1934	11,728	4,679	16,407	7.2	21,903	1,352	485	20.4	433	32.8	1,654	125	55.2
1933	13,279	4,294	17,573	10.0	21,747	1,350	496	21.2	404	29.3	1,651	125	50.6
Southern....1934	28,033	14,092	42,125	13.9	20,794	1,266	477	21.4	403	29.4	2,569	156	43.1
1933	32,043	17,292	49,335	21.7	20,327	1,238	461	21.1	323	23.9	2,412	158	38.9
Northwestern Region:													
Chi. & North Western....1934	44,074	19,244	63,318	14.1	23,423	1,520	495	20.0	225	18.3	1,685	133	37.0
1933	44,807	18,108	62,915	10.2	22,928	1,477	504	21.0	244	18.6	1,822	136	40.5
Chicago Great Western....1934	2,766	2,622	5,388	3.5	33,930	1,786	608	21.7	860	68.7	3,168	135	79.9
1933	3,175	2,920	6,095	6.3	33,667	1,850	613	21.4	724	60.2	3,014	147	79.7
Chi., Milw., St. P. & Pac...1934	55,520	14,170	69,690	3.1	24,840	1,575	603	24.3	335	23.3	2,092	127	51.2
1933	58,999	13,842	72,841	4.6	24,845	1,597	632	25.4	322	21.3	2,096	130	46.2
Chi., St. P., Minneap. & Om....1934	1,991	7,044	9,035	11.0	18,674	1,228	462	22.7	332	22.9	1,827	125	44.7
1933	2,109	6,578	8,687	12.1	17,784	1,213	505	25.4	374	22.9	1,964	128	44.2
Great Northern....1934	42,088	12,888	54,976	6.1	28,328	1,923	753	24.5	331	21.9	2,190	130	41.7
1933	43,262	11,558	54,820	5.7	27,137	1,812	766	26.1	295	17.3	1,922	134	35.6
Minneap., St. P. & S. St. M..1934	15,092	3,349	18,441	2.8	18,476	1,185	443	21.2	277	21.2	1,192	114	74.0
1933	17,106	2,970	20,076	4.5	17,815	1,112	443	22.8	233	16.0	1,092	124	65.8
Northern Pacific....1934	34,776	5,028	39,804	10.6	27,119	1,803	714	23.8	359	23.7	2,230	160	51.1
1933	41,238	4,576	45,814	11.6	25,785	1,723	726	25.3	281	16.8	2,010	160	38.9
Oreg.-Wash. R. R. & Nav..1934	7,325	1,831	9,156	6.7	22,477	1,361	511	21.9	302	20.8	1,306	158	46.3
1933	7,840	1,720	9,560	11.2	21,958	1,383	545	22.1	275	17.8	1,232	151	42.3
Central Western Region:													
Alton....1934	3,209	6,341	9,550	26.1	29,870	1,304	440	22.0	265	20.7	2,743	124	63.7
1933	3,108	5,802	8,910	20.2	26,620	1,313	451	22.6	301	23.5	2,836	124	67.5
Atch., Top. & S. Fe (incl. P. & S. F.)....1934	66,346	8,787	75,133	14.0	30,119	1,612	513	19.7	315	26.4	2,077	115	56.4
1933	65,593	8,612	74,205	13.4	31,707	1,735	550	20.0	345	28.6	2,218	113	56.2
Chi., Burl. & Quincy....1934	34,901	12,526	47,427	8.5	26,418	1,505	618	25.3	501	33.5	2,656	128	73.0
1933	40,102	12,964	53,066	9.5	26,639	1,579	669	26.4	477	30.2	2,786	129	72.7
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)....1934	30,727	10,617	41,344	20.9	21,900	1,258	458	22.3	355	26.5	1,767	148	50.2
1933	35,749	10,266	46,015	21.3	22,467	1,315	477	22.5	336	25.2	1,857	149	55.2
Denver & R. G. Wn....1934	12,760	3,611	16,371	5.3	22,498	1,523	581	22.5	310	21.8	1,922	172	48.6
1933	13,195	3,398	16,593	5.2	23,890	1,714	644	23.3	322	23.0	2,162	176	43.3
Los Angeles & Salt Lake...1934	4,583	1,005	5,588	10.0	30,607	1,673	589	22.0	560	44.3	2,556	146	68.9
1933	4,981	961	5,942	11.7	28,290	1,694	613	21.1	574	43.7	2,768	150	67.0
Oregon Short Line....1934	9,117	4,554	13,671	20.8	26,876	1,620	555	21.5	391	30.9	2,165	129	58.5
1933	9,401	4,788	14,189	19.0	24,885	1,565	592	23.7	423	28.8	2,446	130	53.9
Southern Pacific-Pacific Lines....1934	35,333	21,687	57,020	9.7	31,735	1,994	659	20.4	394	31.1	2,611	110	48.8
1933	38,609	21,520	60,129	14.2	30,619	1,961	624	20.0	362	30.1	2,465	108	46.0
Union Pacific....1934	24,531	9,387	33,918	16.5	46,075	2,006	645	20.0	606	51.1	5,452	115	81.4
1933	24,530	8,499	33,029	19.8	45,697	2,096	669	20.0	644	54.4	5,643	114	75.0
Southwestern Region:													
Gulf, Colo. & S. Fe....1934	10,350	1,754	12,104	8.6	24,320	1,525	605	23.2	289	18.3	1,836	115	47.2
1933	13,059	2,047	15,106	7.9	27,089	1,629	667	25.6	262	16.0	2,063	108	50.6
Mo.-Kans.-Texas Lines....1934	5,954	2,936	8,890	3.3	26,629	1,476	518	21.3	657	50.2	1,779	91	58.5
1933	9,587	3,216	12,803	8.1	27,450	1,589	579	22.3	547	40.6	2,132	91	53.4
Missouri Pacific....1934	21,051	18,584	39,635	4.1	28,485	1,617	601	23.7	518	36.3	2,802	129	64.2
1933	22,768	16,579	39,347	7.2	28,141	1,588	598	24.0	532	36.7	2,838	134	64.7
St. Louis-San Francisco....1934	22,512	4,302	26,814	7.7	22,721	1,258	485	23.7	372	25.4	1,981	140	45.3
1933	23,159	4,608	27,767	7.1	22,866	1,362	528	24.2	383	26.4	2,057	140	42.4
St. Louis Southwestern Lines....1934	3,601	2,527	6,128	7.3	24,131	1,351	478	20.6	510	39.3	1,739	109	55.4
1933	4,530	2,149	6,679	10.7	22,229	1,283	468	20.7	468	34.4	1,670	109	53.4
Texas & New Orleans....1934	8,329	10,530	18,859	6.9	21,542	1,310	480	22.0	413	30.0	1,753	98	54.3
1933	8,881	10,456	19,337	5.9	19,921	1,255	459	21.8	369	26.7	1,593	99	50.6
Texas & Pacific....1934	3,729	4,031	7,760	5.2	24,413	1,762	638	21.6	615	44.5	2,452	94	32.8
1933	3,975	4,677	8,652	5.1	24,330	1,820	665	22.0	568	40.3	2,526	91	31.6

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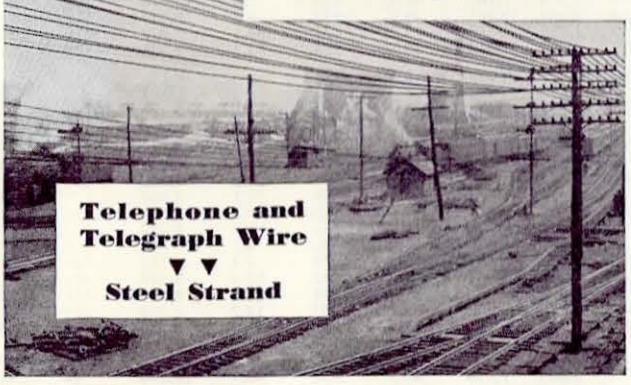

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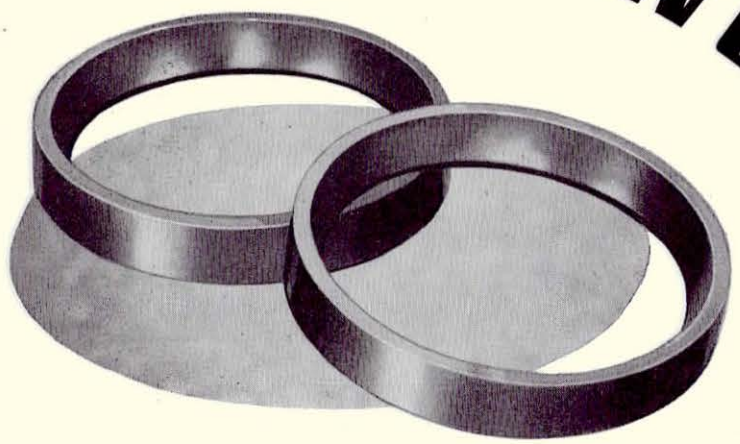

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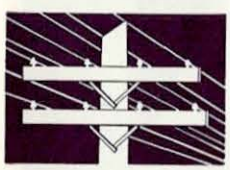

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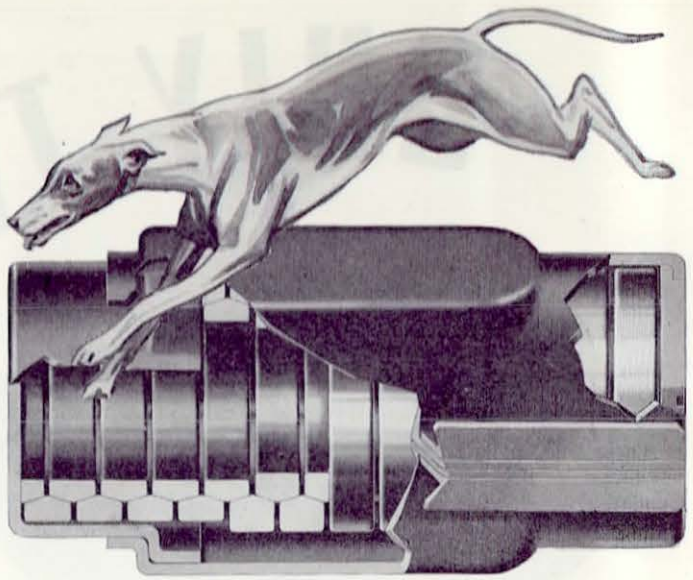

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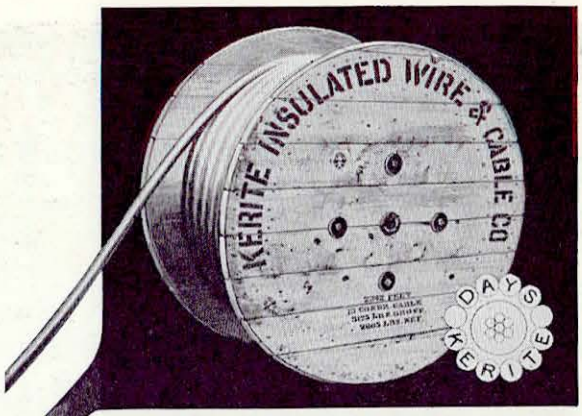

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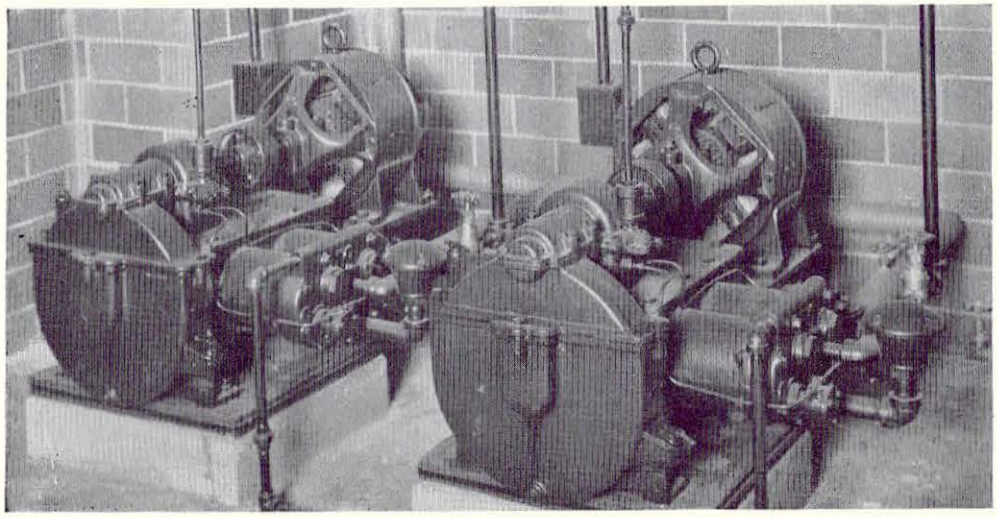

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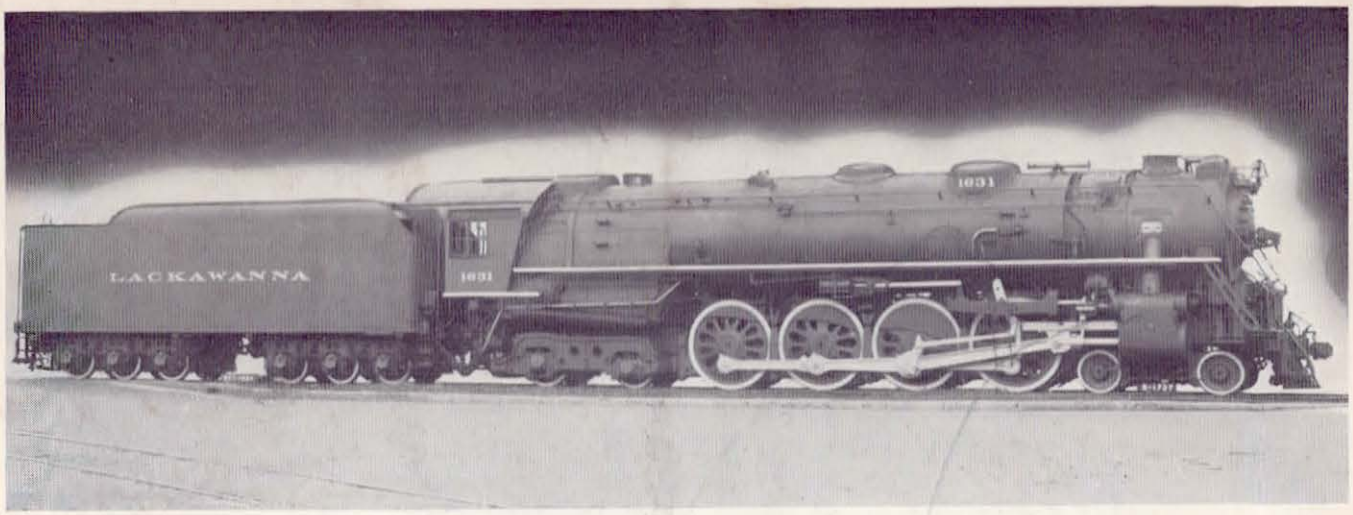

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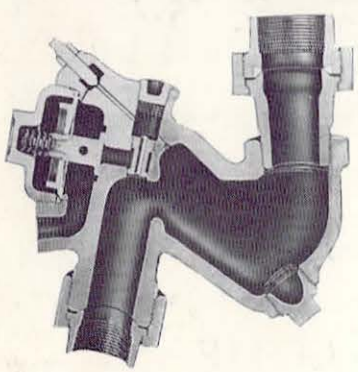

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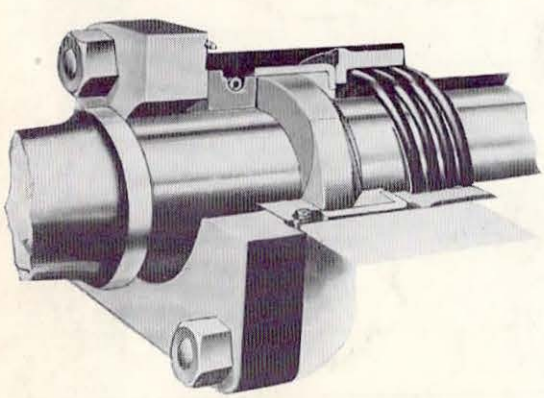

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